Engineering and Maintenance

LAYS HEAVIEST RAIL
IN LESS THAN A MINUTE

TYPE C MECO RAIL LAYER

e new extra long rails are handled
2 Meco Power Rail Layers, one at
ch end of the rail.

e improved, low cost, light weight,
gh capacity Type C Meco Power
il Layer is self propelled on the
. It lifts the rail and sets it down
correct position on the tie plates,
less than a minute.

At left—Meco Power Rail Layer
Laying Standard Length Rails.

★ Maintenance Equipment Company ★
RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

these "maintenance men" are on the job rain or shine

In winter's zero weather or summer's sweltering heat — in traffic or out— Reliance Hy-Pressure Hy-Crome Spring Washers automatically compensate for looseness resulting from wear, bolt stretch or temperature changes.

Quality control of manufacture and never-ending research and testing by Reliance's Research Laboratory help *you* reduce track maintenance costs when Reliance Hy-Pressure Hy-Crome Spring Washers are used on track joint bolts.

The Edgemark Of Quality

The powerful reactive tension developed by the uniformly heat-treated cold-drawn alloy steel used in the manufacture of Reliance Hy-Pressure Hy-Crome Spring Washers keeps rail joint bolts *tighter longer*, reduces maintenance and costly rail joint treatment.

Try Reliance Hy-Pressure Hy-Crome Spring Washers where your maintenance costs are highest and check the results yourself.

EATON

RELIANCE hy-pressure hy-crome SPRING WASHERS

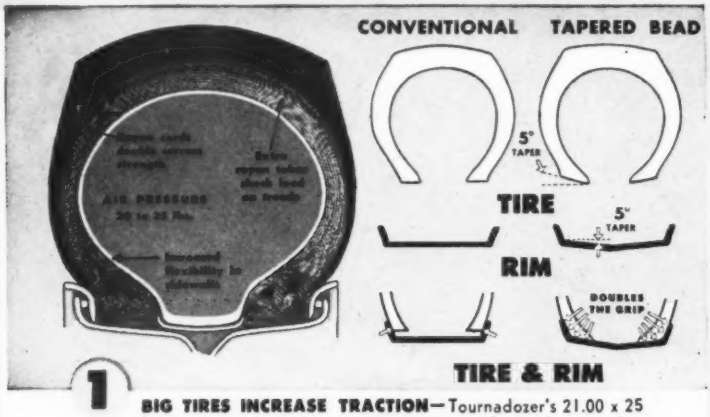
EATON MANUFACTURING COMPANY

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 47, No. 6.

HERE'S WHY 19 m.p.h.



1 **BIG TIRES INCREASE TRACTION**—Tournadozer's 21.00 x 25 low-pressure tires give you greater ground-gripping traction and increased flotation in sand, mud, snow or ice. Tapered bead doubles tire-to-rim grip, prevents tire slipping. Rayon cords add strength and flexibility . . . increase tire life.

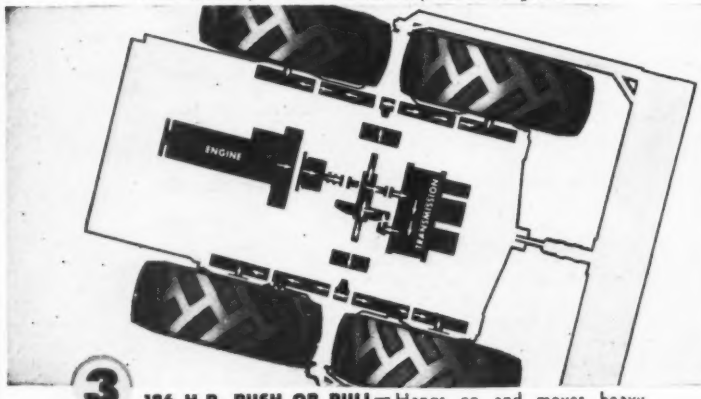
2 **INSTANT GEAR SELECTION**—Change gear ratios instantly, automatically, with finger-tip air-valve lever. Constant power retains vital momentum . . . keeps dirt rolling . . . gets more work done. Tournadozer travels 100' in 3rd gear while ordinary crawler tractor stops to shift gears.

FIRST this job-proved dozer on rubber "runs" at 19 m.p.h., instead of crawling at 5 to 8 m.p.h. It maneuvers twice as fast—and dozes twice as fast as the average crawler. It gives you reverse speeds to 8 m.p.h. . . . cuts deadhead cycle time by 2.5 to 1. And, you get far more use from its greater speeds, because you have instantaneous speed selection and can change into higher gears without shifting or losing momentum.

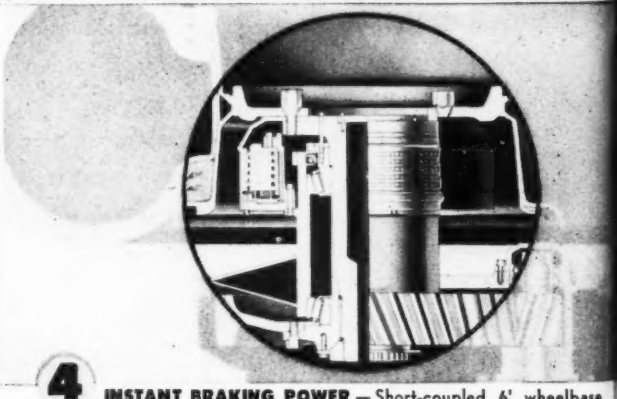
SECOND Tournadozer has the high-speed mobility to put normal waiting periods to work. When needed on scattered odd jobs, operator just hops on this big dozer . . . and drives 19 m.p.h. cross-country or over highways. Tournadozer crosses tracks without blocking . . . keeps main line clear . . . needs no special work trains or loading arrangements. Giant 21.00 x 25 low-pressure tires prevent damage to pavement, tracks, and other surfaces . . . and, in poor footing, give you plenty of traction to pull through mud, sand, or snow which would stall ordinary crawler dozers.

THIRD you can keep Tournadozer working year 'round by equipping it with any of 10 auxiliary tools — including Scraper, Angledozer, Side Boom Crane, Snow Plow. Down pressure on dozing blades is also available. With each, Tournadozer's 186 h.p. engine, 4-wheel drive, and rubber-tired mobility pays off in more work done.

Let your LeTourneau distributor give you all the facts. Call him . . . or write for new Tournadozer Bulletin TD-117 TODAY!



3 **186 H.P. PUSH OR PULL**—Hangs on and moves heavy loads even in toughest going. Low compression ratio diesel engine gives more power with less fuel. 4-wheel drive provides quick pickup on level or up steep grades. Rig rolls on rubber . . . has no tracks to grind in abrasive materials.



4 **INSTANT BRAKING POWER** — Short-coupled 6' wheelbase and instantaneous shift give you a compact, fast-stepping unit. Heavy-duty 4-wheel air brakes, with 719 sq. in. of braking surface on each wheel — 2876 sq. in. on all four — give you safe, sure, complete control at all times.

LET

Send now to: **R. G. LeTOURNEAU, Inc., Peoria, Illinois**

NAME_____
TITLE_____ DEPARTMENT_____
RAILROAD_____
STREET_____ CITY, STATE_____
TYPE WORK TO BE DONE_____

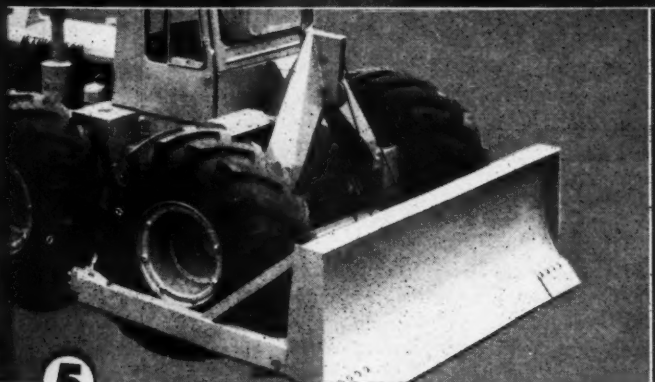
We may be in market for one or more Tournadozers. Please send information on ☐ 186 h.p. C Tournadozer or ☐ 122 h.p. D Tournadozer for use with:

☐ Bulldozer ☐ Side Crane
☐ Angledozer ☐ Rooters
☐ Tree Pusher ☐ Rollers
☐ Carryall Scraper ☐ Root Rake

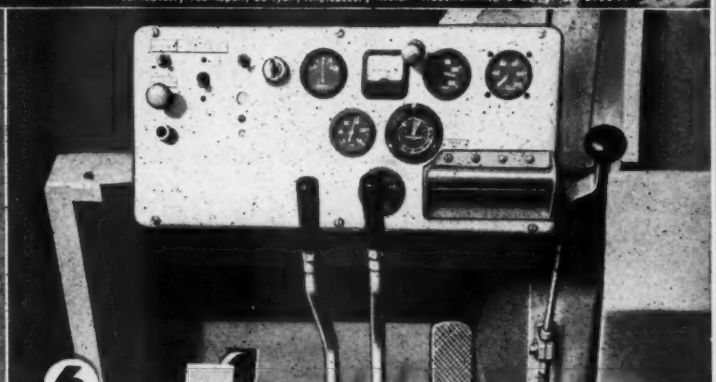
TOURNADOZER will do more work for you

Regrading the Chicago Great Western right-of-way south of Kenyon, Minn., C Tournadozer handles scattered, maintenance-type jobs . . . driving over tracks whenever necessary . . . and shuttling between assignments at 19 m.p.h. speeds. Here, it fills rocky clay around culvert . . . on pusher assignment, it helped 2 C Tournapulls with 10 pay yds. of damp clay and loam in 60 seconds.

Tournadozer, Tournapull, Carryall, Angledozer, Rooter—Trademark Reg. U. S. Pat. Off. C136 r r



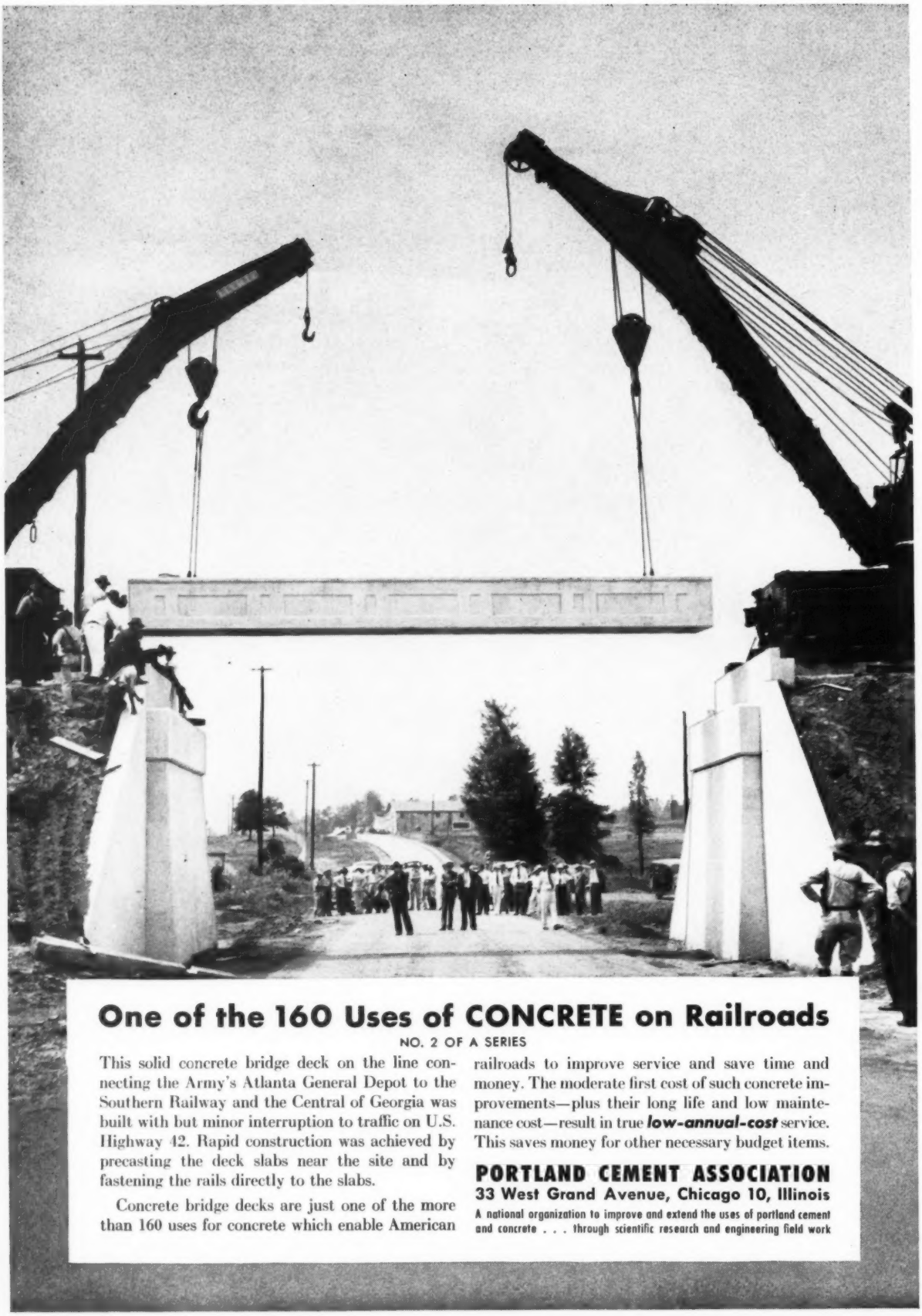
5 **FAST ELECTRIC-CONTROL BLADE**—Electric PCU, plus short-coupled cable connection, gives better blade control to match high dozing speed. 44" lift, unlimited drop, 5" tilt at either end. 11'2" x 3'7" bowl fills fast, drifts big 2½-yd. load. New down-pressure attachment speeds dozing.



6 **EASY TO OPERATE**—Compressed air takes the work out of Tournadozing. Simple controls are air-actuated . . . easy to reach. Operator sits up front ahead of engine . . . can see where he's going, what he's doing. No stretching, no twisting, no end-of-day fatigue slow-down.

LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED The World Over — **TOURNADOZERS**

IT'S RUBBER THAT PUTS THE ACTION IN TRACTION



One of the 160 Uses of CONCRETE on Railroads

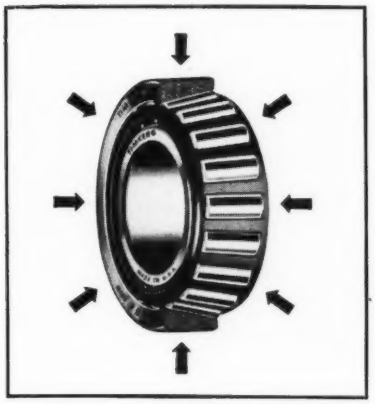
NO. 2 OF A SERIES

This solid concrete bridge deck on the line connecting the Army's Atlanta General Depot to the Southern Railway and the Central of Georgia was built with but minor interruption to traffic on U.S. Highway 42. Rapid construction was achieved by precasting the deck slabs near the site and by fastening the rails directly to the slabs.

Concrete bridge decks are just one of the more than 160 uses for concrete which enable American railroads to improve service and save time and money. The moderate first cost of such concrete improvements—plus their long life and low maintenance cost—result in true ***low-annual-cost*** service. This saves money for other necessary budget items.

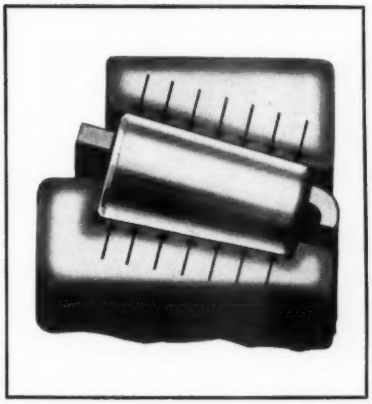
PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



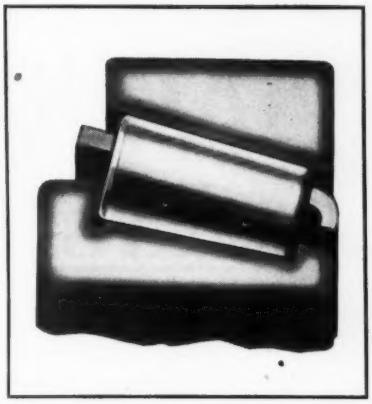
TAPERED CONSTRUCTION

Because Timken® roller bearings are tapered in design, they carry *both* radial and thrust loads. Shafts are held in alignment, auxiliary thrust bearings eliminated, easy adjustment permitted.



LINE CONTACT

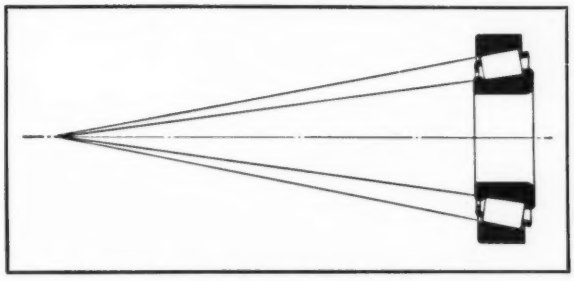
In Timken bearings, the load on the rollers and races is spread evenly over a *line* of contact. Because the load area is greater, Timken bearings offer extra load-carrying capacity.



HARD SURFACE, TOUGH CORE

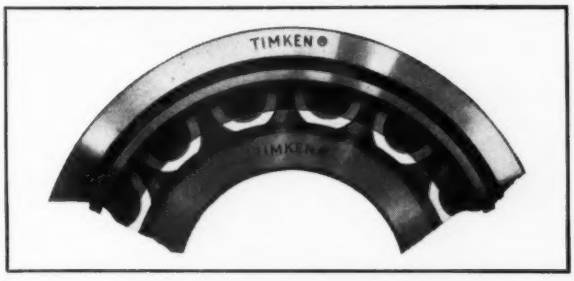
Made of Timken fine alloy steel, rollers and races of Timken tapered roller bearings are case-carburized, resulting in a hard, wear-resistant surface and a tough, shock-resistant core.

To get all this, get TIMKEN® bearings!



TRUE ROLLING MOTION

Since rollers and races of Timken bearings are tapered so that all lines coincident with their tapered surfaces always meet at a common point on the axis of the bearing, the rollers roll smoothly, frictionlessly. Wear is minimized, precision lasts longer. It's another big advantage you get in Timken bearings.



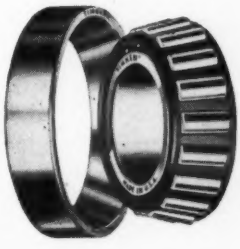
POSITIVE ROLLER ALIGNMENT

Wide area contact between roller ends and rib of the cone insures positive alignment of the rollers in Timken bearings—more precision, less friction, longer wear. Be sure the bearings you buy carry the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

BRIDGE TIE ANCHOR

The Bridge Tie Anchor offers an improved method for securing open deck bridge ties to supporting steel members and creates a strong spring pressure holding the tie and the supporting member firmly together. The spring action compensates for tie shrinkage, seating and stresses.

The Bridge Tie Anchor is low in cost, easy to install and economical to maintain.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

For additional information, use postcard, pages 523-524

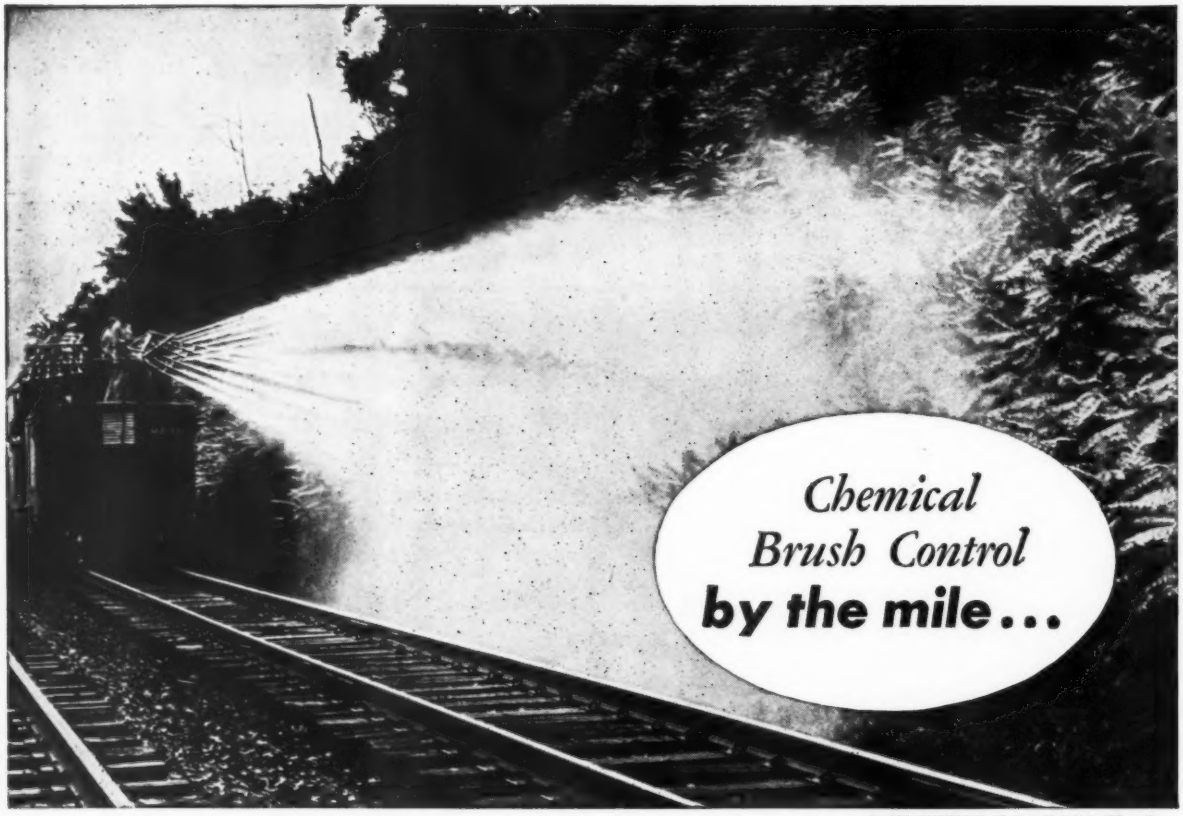


PHOTO COURTESY OF SPRAY SERVICES, INC.

ESTERON *BRUSH KILLER*

Today, miles of right-of-way are cleared and kept clear with Esteron Brush Killer. This widely used Dow formulation now contains more powerful, less volatile type esters of 2,4-D and 2,4,5-T—effective against a wider variety of brush and weeds. It controls alder, ash, birch, brambles, cherry, elm, hickory, maple, oaks, osage orange, poison ivy, sumac, willow, and other hard-to-kill species. It is successful also in controlling resprouting of stumps when applied in oil immediately after cutting.

Dow has approached vegetation control problems *from your side.* As a result, Dow brush, weed and grass killers—used alone, or in combination—can simplify your maintenance and help you reduce clearing costs from 25% to as high as 50% over hand-cutting methods. Your inquiries are invited.

Agricultural Chemical Division

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Esteron 245 is recommended for control of many 2,4-D-resistant woody plants. Where brush is *not* a problem—2-4 Dow Weed Killer, Formula 40 controls annual and perennial weeds on the right-of-way and under bridges. For controlling Johnson, quack, Bermuda and other grasses—use Dow Sodium TCA 90%. Does not present a fire or poison hazard.

DOW

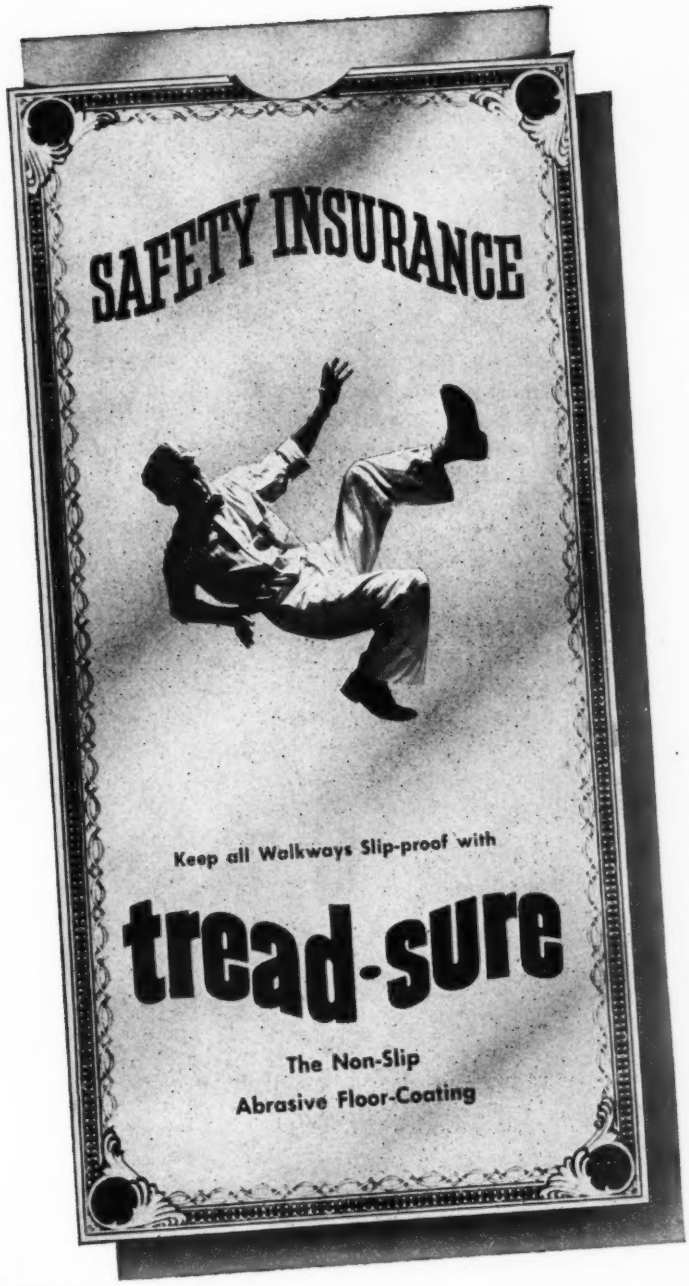
CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

USE DEPENDABLE DOW AGRICULTURAL CHEMICAL PRODUCTS

WEED, BRUSH AND GRASS KILLERS • INSECTICIDES
FUNGICIDES • PLANT GROWTH REGULATORS
GRAIN AND SOIL FUMIGANTS • WOOD PRESERVATIVE

For additional information, use postcard, pages 523-524



Horn Tread-Sure produces a heavy long-wearing anti-skid surface on wood, concrete or steel. Tread-Sure is an abrasive filled brush-coating, simple and inexpensive to apply on any size area.

Tread-Sure is resistant to gasoline, alcohol, oil, grease, detergents, industrial waste and many types of acids. Tread-Sure provides a non-skid safety footing, giving the worker confidence and security by reducing accident hazards.

Tread-Sure maintains traction and resiliency and is comfortable to stand on. Designed for exterior as well as interior use, it may be brush applied over other paint or direct to unpainted surfaces. Used as it comes from container. Three non-glare colors—Battleship Grey, Red, Green.

Uses for Tread-Sure	Used in
Steps and stair treads	Industrial
Aisles—walkways	Plants,
Ramps—gangplanks	Food,
Grease racks—work benches	Milk,
Running boards	Meat Plants,
Washrooms—showers	Hotels,
Elevator floors—landings	Hospitals,
Machinery platforms	Schools,
Scale platforms	Railroads,
Foot pedals	Utilities,
Decks—hatch covers	Service Stations

SUBSIDIARY OF SUN CHEMICAL CORPORATION

horn

A. C. HORN COMPANY, INC.

MANUFACTURERS OF MATERIALS FOR BUILDING MAINTENANCE AND CONSTRUCTION

10TH STREET & 44TH AVENUE, LONG ISLAND CITY 1, N. Y.

LOS ANGELES • SAN FRANCISCO • HOUSTON • CHICAGO • TORONTO

HORN

RE-51

GENTLEMEN:

Please send complete data on TREAD-SURE.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

THE *NEW* JORDAN

Road-Master

SPREADER • DITCHER • SNOWPLOW

Does the Work of an Army of Men

in the new Jordan Road-Master you find the latest of mechanical features coupled with the traditional Jordan ruggedness and reliability. You find work-tested improvements in design and manufacture combined with the economy of operation that has distinguished Jordan machines for more than forty years. And, as you would expect of any new or old member of the Jordan "family,"

—IT'S A YEAR-AROUND MAINTENANCE CREW!—

During season it spreads, ditches, plows and shapes ballast, profiles roadbed, spreads fill and carries dirt. During the winter the Jordan Road-Master flanges and bucks snow in one operation . . . in classification yards, on open track and in deep cuts. Rips out ice and packed snow below the top of the rail too. To learn more about this year-around maintenance crew, write to O. F. Jordan Company, Walter J. Riley, Chairman of the Board, East Chicago, Ind.

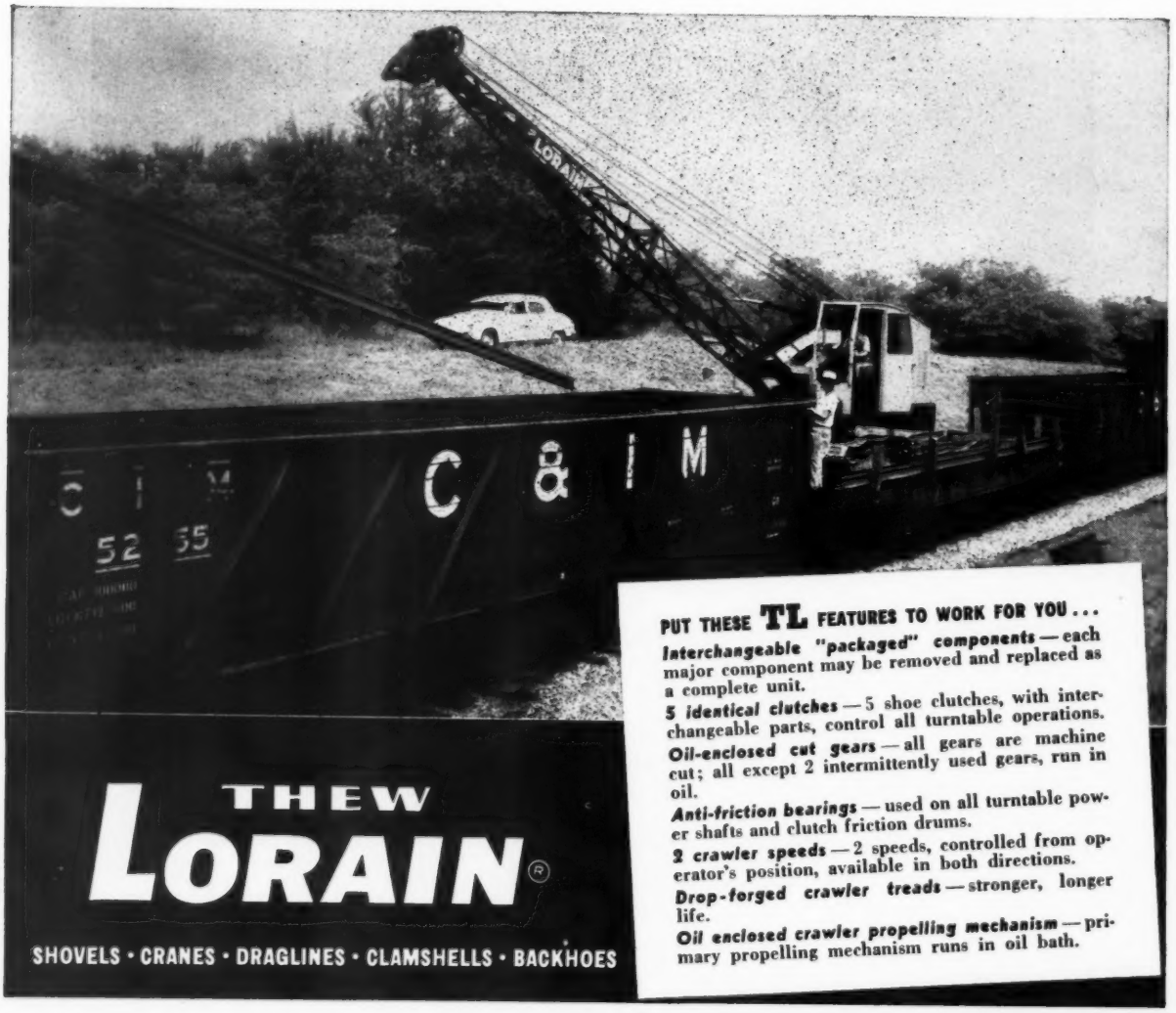
LORAIN HANDLES RAIL ON THE RUN For C. & I. M. Railroad

• The Chicago & Illinois Midland Railroad Co. gives maintenance work the "high-ball" signal with their new Lorain-TL Crawler Crane. Here, near Long Branch, Illinois, it works from atop a flat car to pick up and load old rails that have been replaced with new, heavier rails. The Lorain also loads and unloads tie plates angle bars, and anchors along a 3-1/2 mile stretch of track.

Whether the operation calls for on-the-car service like this, or off-the-car work . . . whether it's on-the-track or off-the-track work, a Lorain will do the job, just as C&IM's Lorain also works as a clamshell and dragline for maintenance, excavating and grading.

The C&IM Railroad is taking full advantage of the many Lorain features listed below, to increase output, save time, lower costs and reduce labor. You can do the same—and your nearest Thew-Lorain Distributor will be glad to give you all the facts.

THE THEW SHOVEL CO., LORAIN, OHIO



PUT THESE TL FEATURES TO WORK FOR YOU . . .

Interchangeable "packaged" components — each major component may be removed and replaced as a complete unit.

5 identical clutches — 5 shoe clutches, with interchangeable parts, control all turntable operations.

Oil-enclosed cut gears — all gears are machine cut; all except 2 intermittently used gears, run in oil.

Anti-friction bearings — used on all turntable power shafts and clutch friction drums.

2 crawler speeds — 2 speeds, controlled from operator's position, available in both directions.

Drop-forged crawler treads — stronger, longer life.

Oil enclosed crawler propelling mechanism — primary propelling mechanism runs in oil bath.

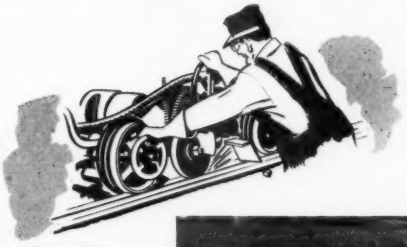
THEW LORAIN®

SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES

For additional information, use postcard, pages 523-524

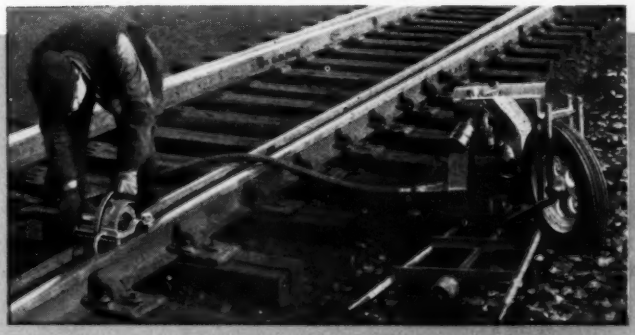
Use the RIGHT GRINDER for every job . . . **choose from**

4 NORDBERG GRINDER MODELS



For reconditioning rail, switches, frogs and crossings, Nordberg offers four different grinders for fast, low cost maintenance grinding. From these four Nordberg Grinders you can select the type best adapted to meet your individual requirements.

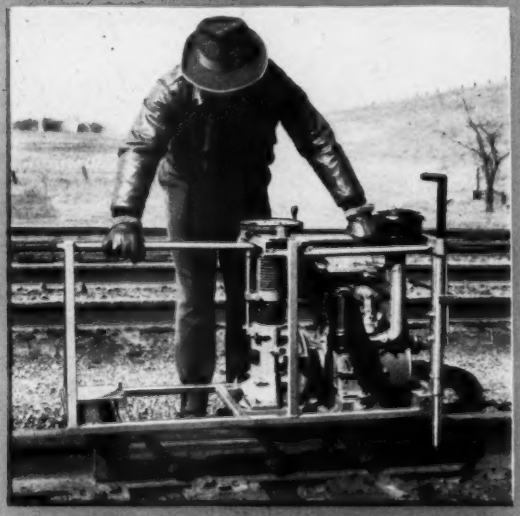
Write for further details.



UTILITY GRINDER, removing flow from switchpoints and stockrails. With other Nordberg accessories, it can be used for surface grinding, rail end slotting, frog grinding, etc. Particularly suited for congested traffic areas.

FLEXIBLE ARM GRINDER, grinding switchpoint. With various types of grinding wheels this grinder is also used for rail end slotting, undercutting stockrails, grinding frogs, etc. A fast cutting grinder with big production capacity.

HEAVY-DUTY RAIL GRINDER, grinding a frog. Recommended where speed, output, and accurate surface grinding are desired. With accessories, it can be used for slotting rail ends, grinding switchpoints, and flangeway grinding at frogs and crossings.



MIDGET GRINDER, a one-man cup wheel grinder for surface grinding welded joints, removing mill tolerance and equalizing cropped rails. Specially applicable in congested traffic areas.

8451

Look to **NORDBERG** . . . *for continually improved* TRACK MAINTENANCE MACHINERY *to do a Better, Faster Maintenance Job at Lower Cost*

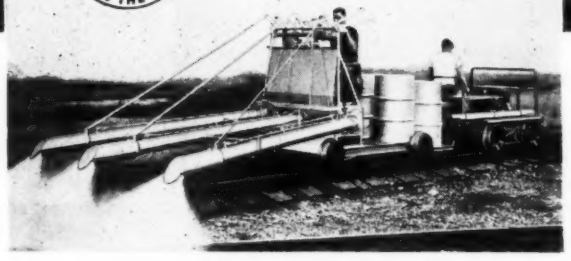
NORDBERG MFG. CO., Milwaukee 7, Wisconsin

Mechanized maintenance aids good housekeeping on The Southern

THE SOUTHERN SERVES THE SOUTH

SAFE roadbeds are clean roadbeds. Keeping right-of-way and ballast weed-free is an essential of efficient maintenance, and keeping down the cost of weed elimination is a budget necessity. In both respects WOOLERY Weed Burners are used by The Southern and many other major railroads, to help in the continuous job of maintaining sound track under increasing traffic.

Other WOOLERY Weed Burners are made in 1-, 2-, and 5-burner models. Write for brochure and complete information.



WOOLERY PB-B WEED BURNER

A 3-burner model is mounted on an underslung steel trailer car, to be towed by a motor car. **Only two operators are required.** This efficient burner destroys ALL types of weeds in a 15-foot swath. (With burner arms extended, a 25-foot swath may be burned by making a second trip.)

All three burners have electric ignition and can be turned on or off separately; one, two, or three burners may be used at one time as conditions require. All three burners are provided with individual controls and may be raised or lowered, swung in or out, while machine is in operation.

The WOOLERY PB-B Weed Burner will clear track, yards, or terminals of weeds in the growing season, and may be used as a snow melter in winter.

WOOLERY

WOOLERY MACHINE COMPANY

MINNEAPOLIS MINNESOTA

Pioneer Manufacturers of RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • FLANGEWAY CLEANERS • TIE CUTTERS • TIE PLATE SPACERS • RAIL JOINT OILERS • CREOSOTE SPRAYERS

EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., NEW YORK, N. Y.

for lower cost

Building up a worn switch point in traffic.

. . . restoring battered rail ends
. . . building up worn frogs and switch points
. . . reconditioning crossings

—use AIRCO TIME-PROVED METHODS

Battered rail ends, worn frogs and switch points are quickly rebuilt with the Airco No. 800 welding torch — then heat treated with the same torch for longer life. These operations may be done either in the shop, or in track . . . and are but two of the many ways the versatile "800" is helping railroad men cut maintenance costs.

Yes, Airco time-proved oxyacetylene methods, using the "800" torch are ideal for maintenance-of-way operations. Why? Because wide selection of tip assemblies that are available for the "800" make it suitable for welding, flame cleaning, flame shrinking eye bars, and building up wheel burns as shown here.

Furthermore, with the addition of a cutting attachment, the Airco "800" can be easily converted to handle cutting jobs from thin sheet up to 6″ plate.

In addition to this wide operating range, other features of the "800" are: better flame control . . . perfect balance . . . and low maintenance cost.

For more information about this exceptional welding and cutting torch, as well as building up rail ends, hard-facing, flame cleaning or any other process in which Airco can help you, call or write your nearby Airco office, today.

Welding wheel burns with Airco RR rod.

Flame cleaning bridge structure.

Flame shrinking eye bars.

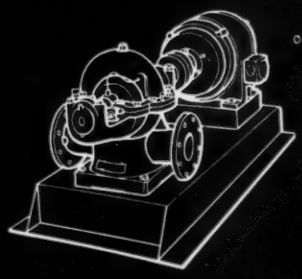
Costs Come Down Under the Airco Plan

AIRCO

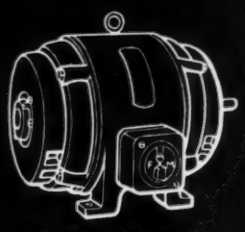
AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

For additional information, use postcard, pages 523-524

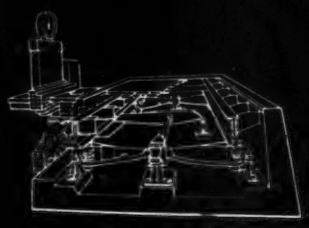


Centrifugal Pumps

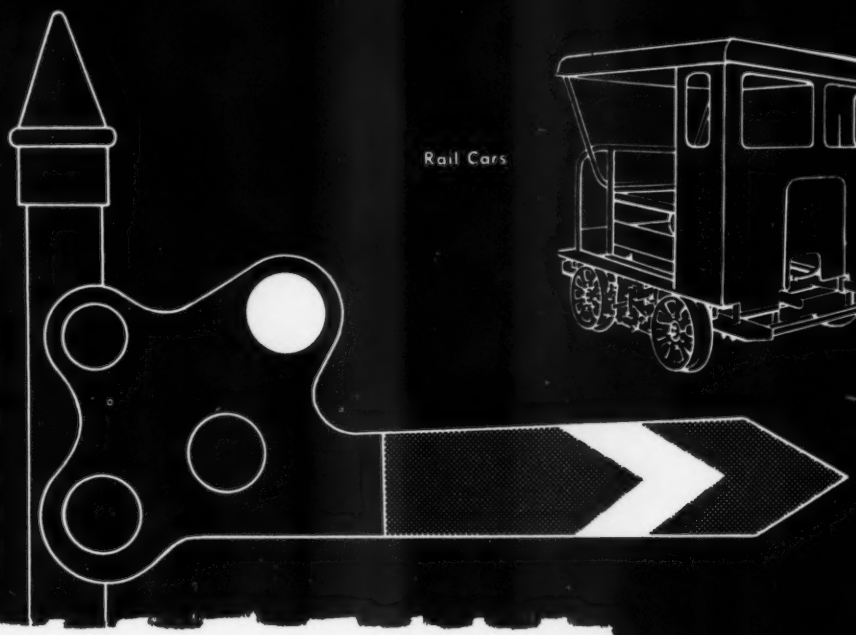


Electric Motors
and Generators

Turbine Pumps



Truck Scales



Rail Cars

FOR RAILROAD EQUIPMENT

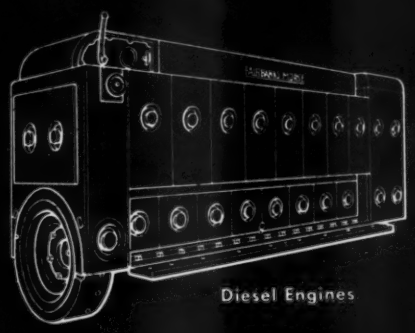
IT'S

FAIRBANKS-MORSE,

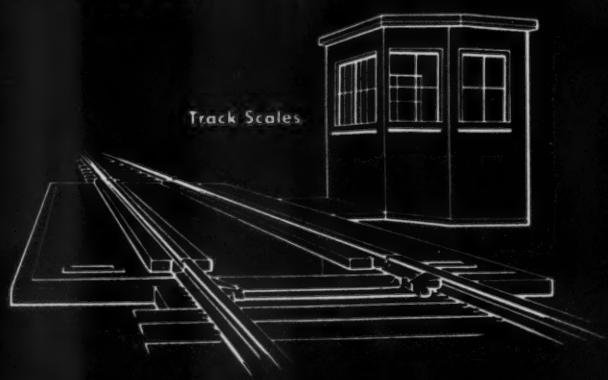
a name worth remembering

DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT
RAIL CARS • FARM MACHINERY

Water, Coal and
Sanding Stations



Diesel Engines



Track Scales

Name your ballast.

for track at its level best!

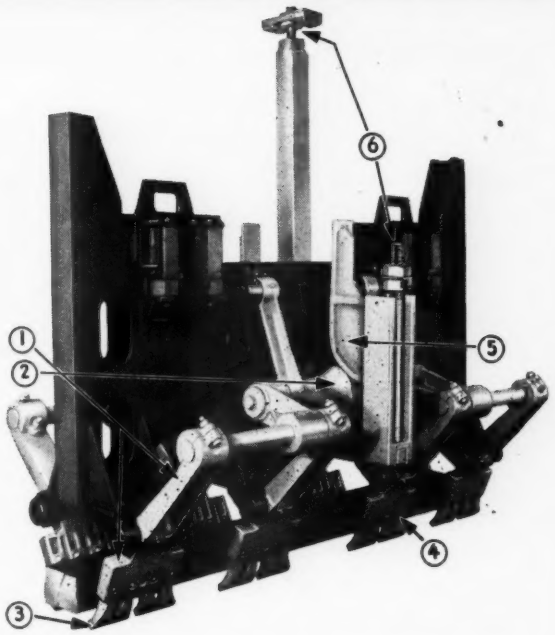
...name your track raise

HERE'S THE MACHINE TO HANDLE IT!

If you want a ballaster that takes track as it comes and leaves it *as you like it* . . . the Pullman-Standard Power Ballaster fills the bill!

You can tamp any kind of ballast with it—cinders or chats, gravel or slag, limestone or traprock. And you can tamp any raise up to 8 inches—on rail of any weight.

Note these *exclusive features* that make the Power Ballaster the only universally useful mechanical tamper available today and enable it to produce finished track of highest quality and longest life . . . at lowest cost.



❶ An ingenious linkage system, directed inward by cam action, progressively multiplies the tamping force throughout the stroke—eliminating ballast breakage and producing maximum compaction where wanted, *underneath the tie*.

❷ The linkage system and special rollers apply the tamping force *equally to all tamping bars*—guaranteeing uniform tamping action.

❸ Tamping bars are available in *five sizes*, and are readily interchangeable to meet varying raise and ballast conditions.

❹ The *number* of these bars in use at any time may also be varied, in accordance with job requirements—to preclude centerbound track and insure the most effective utilization of tamping power.

❺ The exclusive Power Ballaster cam and the unique tamping-bar design guide the tamping force *downward*, then *inward*, then *upward*—producing *triple-action* compaction impossible with any other tamper.

❻ A readily made adjustment regulates the *depth* reached by the Power Ballaster's controlled compaction—applies the maximum tamping force exactly where wanted.

POWER BALLASTER PRODUCTS DIVISION

Pullman-Standard

CAR MANUFACTURING COMPANY

BIRMINGHAM 3, 1004 First National Building • CLEVELAND 15, 907 Midland Building
NEW YORK 17, 52 Vanderbilt Avenue • PITTSBURGH 19, 1115 Gulf Building
WASHINGTON 6, D. C., 1025 Connecticut Ave., N. W. • SAN FRANCISCO 4, 2910 Russ Building
CANADA: The Holden Co., Ltd. • Montreal 3, 614 St. James St. W.
Toronto, 128 Simcoe St. • Winnipeg, 150 Princess St. • Vancouver, 769 Powell St.

MORE than a family resemblance

Regardless of what size Oliver Industrial Wheel Tractor and Ware Loader you buy . . . "66", "77", "88" . . . you get the identical superior design and performance features in each.

The smaller tractor-loaders are not built down to a price level . . . they are built up to the same quality standards as the larger models.

In the tractors, you get the famous Oliver *plus* power and easy maneuverability that get you in and out of the rough spots . . . *fast!*

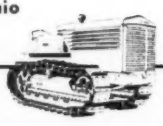
In the loaders, you get the same top features in each . . . hydraulically controlled bucket for greater "breaking out" action—full bucket loads . . . hydraulically controlled discharge—easily and gently, fast or slow . . . mid-section pivot of the loader arms for longer reach of dumping position and correct weight distribution on tractor frames . . . simple, rugged design that eliminates unneeded dead weight . . . shock loads absorbed by hydraulic rams for longer tractor and loader life—lower maintenance.

Your Oliver Industrial Distributor will be happy to show you what the "more than a family resemblance" in Oliver-Ware Tractor Loaders means to you in lower cost operation. And see the Oliver color film "Task Force on Wheels."

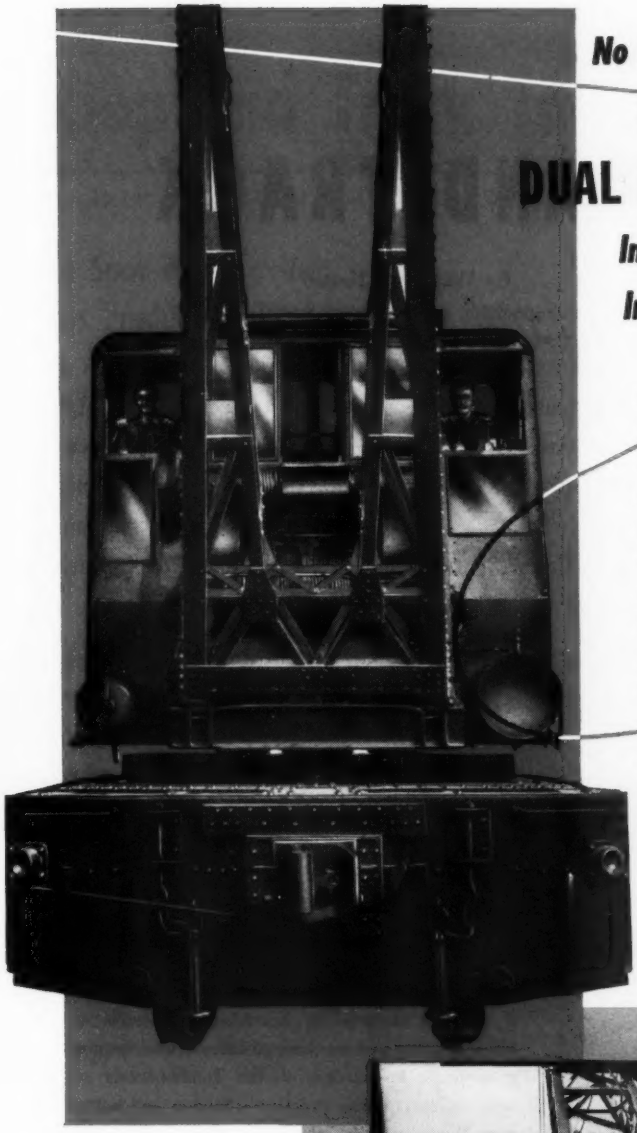
THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of industrial wheel and crawler tractors



For additional information, use postcard, pages 523-524



No Need For a Ground Man With

NEW BROWNHOIST DUAL CONTROL DIESEL CRANE

Increases Safety and Efficiency In Maintenance-Of-Way Work

Industrial Brownhoist's Dual Control Locomotive Crane, with a complete set of interlocking controls on each side of its high Monitor-type cab, is ideally suited to maintenance-of-way work because it affords 100% visibility *on either side of the track and to the rear.* The operator of a Dual Control Crane has no blind spots, thus there's no need for a ground signalman. When the operator's work shifts, he has merely to lock the controls where he's sitting, cross to the opposite side and continue his work with the other set of controls. Brownhoist Dual Control Locomotive Cranes are available in all capacities from 20 tons up, with travel speeds ranging up to 13 m.p.h.

Added safety and efficiency is assured because the Dual Control Crane, like all Industrial Brownhoist cranes, is equipped with the new open-type boom that allows the operator full visibility even when the boom is in line with his work. 14" safety clearance is provided between revolving upperworks and carbody.

OPERATOR'S VIEW OF LEFT SIDE OF TRACK

OPERATOR'S VIEW OF RIGHT SIDE OF TRACK

BROWNHOIST BUILDS BETTER CRANES

141

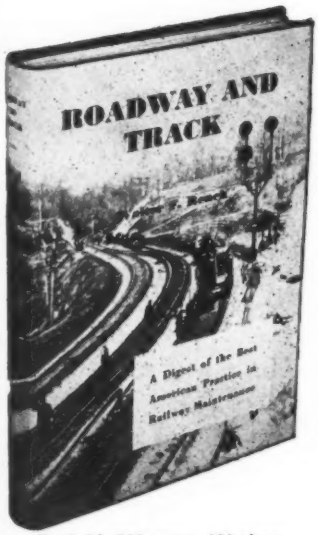
INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Chicago, San Francisco, Canadian Brownhoist Ltd., Montreal, Quebec.
AGENCIES: Detroit, Birmingham, Houston, Los Angeles, Portland, Seattle, Spokane.

A Handbook of
Modern Track Work

ROADWAY AND TRACK

By Walter F. Rench
Formerly Supervisor on the Pennsylvania Railroad;
Author of Simplified Curve and Switch Work



Third Ed. 350 pages, 101 photographs 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00.

The third edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the **Pennsylvania**, A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

SUPPLEMENT: A 10-page Supplement describing new A.R.E.A. recommendations and changes up to July 1, 1948, can be cut for insertion in proper place.

Send For Your Copy Today

Send for a copy today and see how it will help you improve your knowledge of your work.

TRACK SUPERVISORS

While written primarily to serve the needs of track supervisors and other maintenance officers, it contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work will find it particularly helpful.

— - Ten Days Free Examination Coupon - -

Simmons-Boardman Publishing Corporation
30 Church Street, New York 7, N. Y.

Please send me on Ten Days Free Examination a copy of the Third Edition of ROADWAY AND TRACK by Walter F. Rench. If satisfactory, I will remit the list price of $5.00. Otherwise, I will mail the book back postpaid, without obligation.

Name .....

Address .....

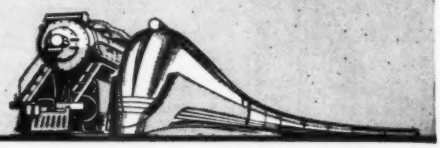
City ..... **State** .....

Company ..... **Position** .....

This offer is limited to retain customers in the United States

R. E. & M. 6-51

"Shop and Track Talk"



Published by OXWELD RAILROAD SERVICE COMPANY, a Division of Union Carbide and Carbon Corporation

Portable Spot-Welding Unit Reduces Production Time

When a railroad car manufacturer began positioning angle-bar stiffeners by spot-welding, he cut the time required to do one car side from 6 hours to less than 1½ hours. By reducing this positioning time, the manufacturer speeded up the production line, and reduced his cost. He also made a man available for other work—one man now does the work two men did previously.

Positioning time was reduced with the portable unit shown in Fig. 1. A transformer with a built-in high frequency unit, complete with a HELIARC Spot-Welding gun, argon cylinder, and water tank with a circulating pump were mounted on a rubber tired truck. The completely portable unit requires only an electrical outlet for power supply.

To spot-weld the stiffeners to a car side, the operator positions the spot-welding gun, and simply pulls the trigger. Water, argon, and current flows are all timed automatically so that no special skill is required to make clean, strong welds. Fig. 2 shows how easily the spot welds are made.

This application of inert gas-shielded arc welding can be used for many other applications. Ducts, tubes, containers, and other light structures of mild steel, low alloys, or stainless steel, 0.030 to 0.064 in. thick can be joined in one or two seconds per weld. Ask OXWELD for additional information on spot-welding with a HELIARC torch.

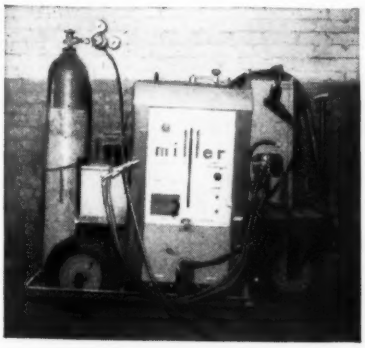


Fig. 1 — Portable spot-welding unit which can be moved from job to job by one man.

Fig. 2 — Spot-welding the car stiffeners in position.

How Long Can RIBBONRAIL Be?

As long as you want it! Today there are enough strings of long welded rail in main-line open track in all kinds of climatic conditions to prove that continuous rail presents no expansion or contraction problem. In fact, the total movement at the ends of a continuous rail one mile long is about the same as the movement of a 39-ft. rail with conventional fastenings.

Obviously, the long rails are restrained against movement. Actual restraint is afforded by the joint fastenings at the ends of the long stretches of rail; by the frictional resistance of the tie plates and the rail fastenings; and by the application of anti-creepers for a sufficient distance from the ends of the rail.

Write OXWELD for more information.

What's News?

► Rail-end welding gangs of several railroads are now eliminating driver burns at the same time they build up rail ends. By using OXWELD MW rod, original surface of the rail is restored.

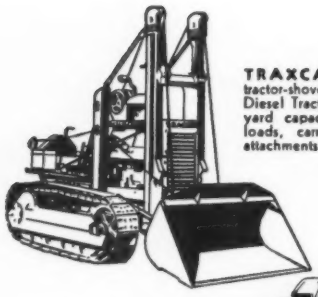
► Over 115,000 welds in rail have now been made in OXWELD pressure-welding machines. Although these welds have been made over a period of 12 years, over half of them have been made in the last three years alone.

► Strong aluminum beds and bases for roomette cars are now made by means of HELIARC welding. The clean, strong welds are made quickly since no flux is required.

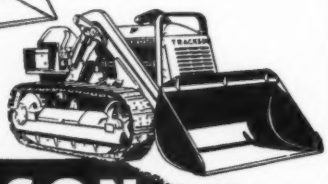
► An ingenious four blowpipe, machine-cutting setup uses twin nozzles to produce ready-to-weld edges on each side of new formed car stakes, or for trimming off the rivet holes on old stakes. The double-edge cuts mean less work and faster production of finished parts.

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
Carbide and Carbon Building UCC Chicago and New York

The terms "Heliarc," "Oxweld," and "Ribbonrail" are trade-marks of Union Carbide and Carbon Corporation.



TRAXCAVATORS — famed mechanical tractor-shovel teammates of "Caterpillar" Diesel Tractors. Four sizes — 1/2 to 4 cubic yard capacities. Digs, grades, spreads, fills, loads, carries, lifts, stockpiles. Specialized attachments available.

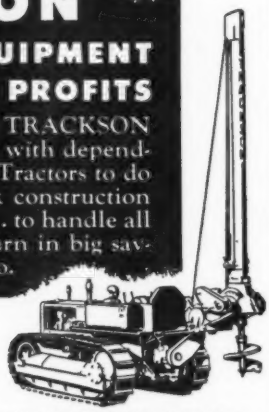


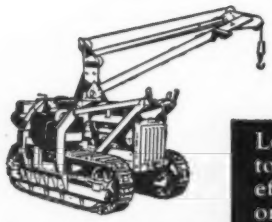
HYDRAULIC TRAXCAVATOR — fast, powerful digging, loading, carrying unit — where headroom is at a minimum. Job-multiplying attachments available.

TRACKSON

OFF-TRACK EQUIPMENT FOR ON-TRACK PROFITS

Versatile, world-proved TRACKSON Tractor Equipment teams with dependable "Caterpillar" Diesel Tractors to do a wide variety of off-track construction and maintenance work . . . to handle all type of materials . . . to turn in big savings on every task they do.



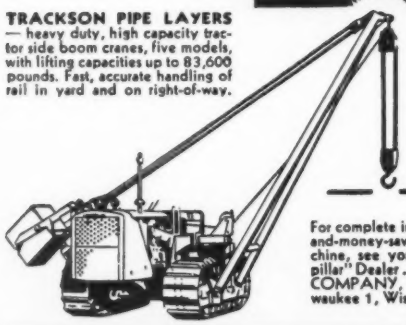


TRACKSON EARTH AUGER — bores holes at any usable angle; for telegraph and telephone poles, signal tower footings, anchor holes, etc., sets poles with ease. Winch included.

TRACKSON SWING CRANE — 6000 pound capacity; ease of control; telescoping boom; 300° swing!

Long-lived TRACKSON tools multiply manpower efficiency to get jobs done on schedule without interrupting traffic. Depend on TRACKSON equipment to help carry you through your heavy construction and maintenance work schedules.

TRACKSON PIPE LAYERS — heavy duty, high capacity tractor side boom cranes, five models, with lifting capacities up to 83,600 pounds. Fast, accurate handling of rail in yard and on right-of-way.



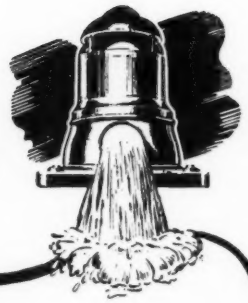
TRACKSON

- ANGLEFILLERS
- TRACLOADERS
- LIFT FORK
- LAND CLEARING EQUIPMENT
- ANGLEGRADERS
- DOZER BLADES

For complete information on any time-and-money-saving TRACKSON machine, see your TRACKSON-"Caterpillar" Dealer . . . or write TRACKSON COMPANY, Dept. RE-61, Milwaukee 1, Wisconsin.

TRACKSON
TRACTOR EQUIPMENT

CONSIDER DURABILITY



The installation of a Layne Well Water System is your guarantee of an abundant water supply with the lowest possible operating cost. The extra durability built into all Layne equipment assures you of dependable performance with little attention and practically no upkeep. For further information, catalogs, etc. address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

CLASSIFIED ADVERTISEMENTS

Use this section when seeking a new man, new position, or when buying or selling secondhand equipment.

CLASSIFIED ADVERTISEMENTS . . .
$10.00 an inch, one inch deep by three inches wide, an insertion.

EMPLOYMENT ADVERTISEMENTS
10 Cents a word a month, including address, minimum charge $2.00. Remittance must accompany each order.

Railway Engineering and Maintenance
Classified Advertising Department
79 W. Monroe St., Chicago 3

HELP WANTED

Office Engineer, Maintenance of Way, for small railroad near Chicago area. Should have 20 years experience in track and roadway maintenance and engineering. Write and indicate interest and experience. Will send questionnaire for full particulars. Write Box 651, Railway Engineering and Maintenance, 79 W. Monroe Street, Chicago 3, Ill.

KNOW RAILROAD TRACK?

Salaried position with manufacturing company, requiring good track background (preferably track experience up to track supervisor or better and preferably engineer) selling rapidly growing product that cuts both material and maintenance costs on track and bridges. Selling experience desirable, but not necessary. We would be interested in any man who, if absolutely sure himself that the product would provide major savings and improvements, feels he could convince chief engineers and others that they should use it. Write 651A, Railway Engineering and Maintenance, 79 W. Monroe Street, Chicago 3, Ill.

MULTI-PURPOSE

NEW TYPE COATING

1. Prolongs rail life

2. Cuts railway maintenance costs

Rust-Chek

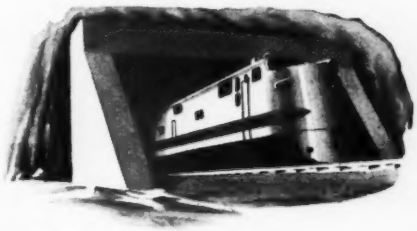
CORROSION-RESISTANT COATING

...resists water, salt and acid fumes

RUST-CHEK was originally developed by the Rinshed-Mason Company to prevent the notoriously excessive corrosion of railway track in tunnels. Applied to the web and base of rails, Rust-Chek prolongs rail life where the going is rough; is unaffected by the impact of train wheels and the consequent flexing of the rails.

Today, Rust-Chek is finding ever widening acceptance for numerous other railway applications, but especially where corrosion conditions are severe, for Rust-Chek possesses exceptional resistance to water, salt and acid fumes; retains, with long years of service, unusual qualities of flexibility and adhesion that definitely prevent cracking, chipping or peeling.

Investigate now! Skilled R-M engineers to assist you.

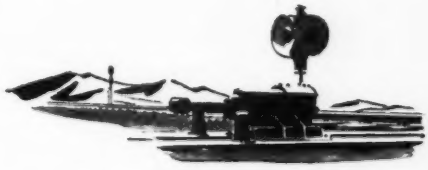


PREVENTS EXCESSIVE RAIL CORROSION

Salt, water and acid fumes often cause frequent and costly rail replacement. Rust-Chek prevents excessive corrosion, but especially in certain tunnels; on rails subjected to brine drippings from heavy refrigerator car traffic; on rails running close to salt water, at grade crossings, etc.

PROTECTS BRIDGES AND STRUCTURAL STEEL

Bridges, round-house structural steel, etc., can be quickly and easily coated with Rust-Chek, adding countless years of life and greatly lengthening time between coats. Rust-Chek puts up a solid front against salt spray, locomotive fumes and moisture.



PROLONGS LIFE OF COSTLY EQUIPMENT

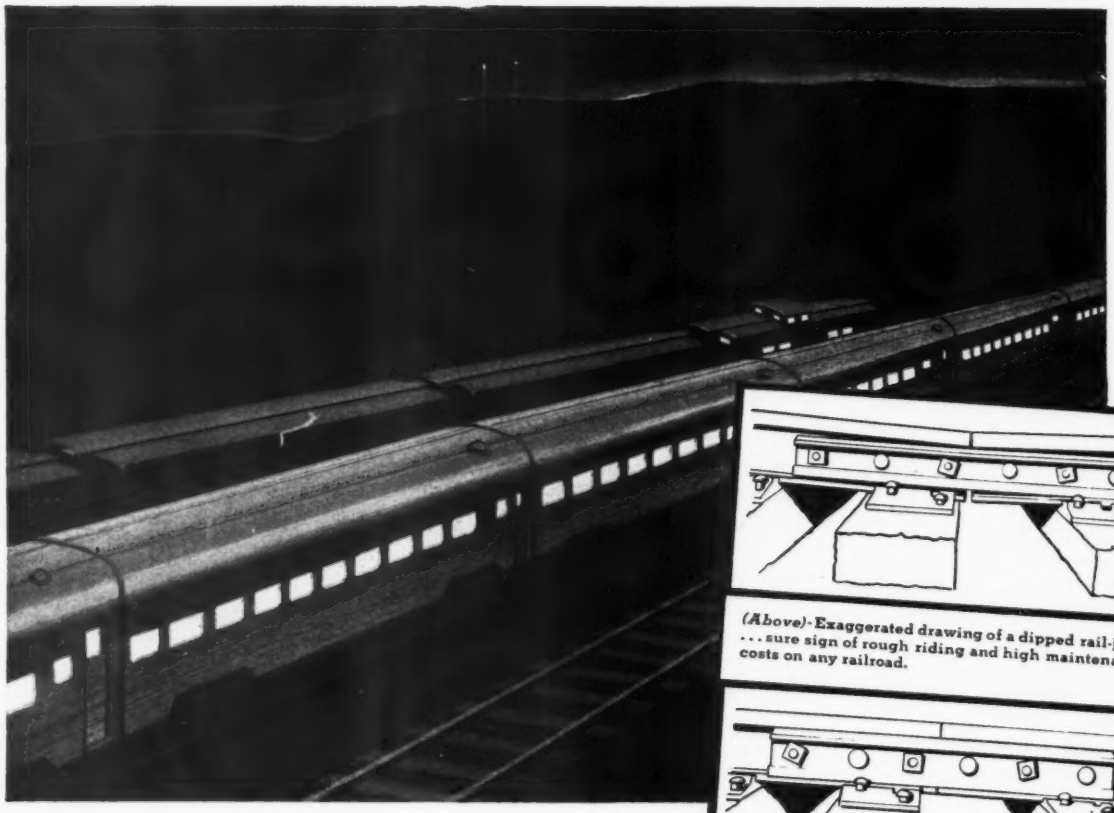
Signalling equipment, water towers, steel boats, barges, buoys, docks, and numerous other types of railway-owned equipment, need Rust-Chek protection for greatly prolonged service life. Unusually tough and highly water resistant, Rust-Chek is easy to apply, calls for no special equipment and may be either brushed or sprayed.

Write for DESCRIPTIVE FOLDER

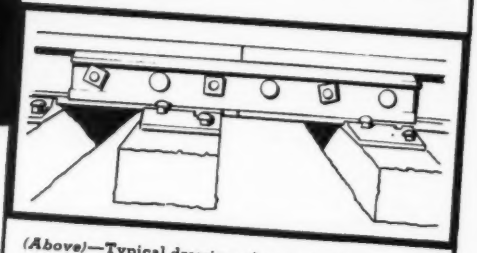
Free Descriptive Folder and specifications will be sent you on request. Test sample will also be forwarded if wanted. *Write now.*

RINSHED-MASON CO.

5935-71 MILFORD AVE. . . . DETROIT 10, MICH.



(Above)-Exaggerated drawing of a dipped rail-joint . . . sure sign of rough riding and high maintenance costs on any railroad.



(Above)—Typical drawing of a rail-joint brought to exact level *to stay* with the individually operated tamping arms of the Matisa Tamper.

●

(Below)—Tamping shoes of Matisa Tampers *do not* pound ballast to powder—vibratory pressure action compacts ballast *under ties*, as well as at sides.

SMOOTH RUNNING ON *Matisa*-TAMPED JOINTS

LEVEL track and smooth joints speed schedules, save track and equipment maintenance, make passengers rail travel boosters . . . And this is the track you get with Matisa precision tamping . . . The only power tamper available that compacts while vibrating *under ties* for level joints and rails that *stay level.*

Write to our M. W. Engineering Department for full details.

THE MATISA EQUIPMENT CORP.
224 South Michigan Blvd. • Chicago 4, Illinois

ALL OVER THE WORLD
Matisa TRACK MAINTENANCE SPECIALISTS

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

RAILWAY ENGINEERING AND MAINTENANCE

June, 1951

Please send me additional products information as requested below:

☐ Literature Only ☐ Desire to see Representative ☐ Price Data

Product and Page No. .....

" " " " .....

" " " " .....

Name .....

Title or Position .....

Company .....

Address ..... City ..... Zone ..... State .....

(Please Fill Out Card In Full)

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 33018, Sec. 34.9, P.L.&R., Chicago, Ill.

RAILWAY ENGINEERING & MAINTENANCE

30 Church Street

New York 7, New York

READER SERVICE DEPT.

HOW TO MODERNIZE CAR DUMPERS THE EASY WAY

The Lakefront Dock and R.R. Terminal Co. modernized and expanded its Toledo car dumper facilities to provide better service. It found that by ordering all its electrical equipment from one manufacturer it could place the responsibility and headaches of co-ordinated engineering and product delivery in a central location—it took advantage of G.E.'s project co-ordination system.

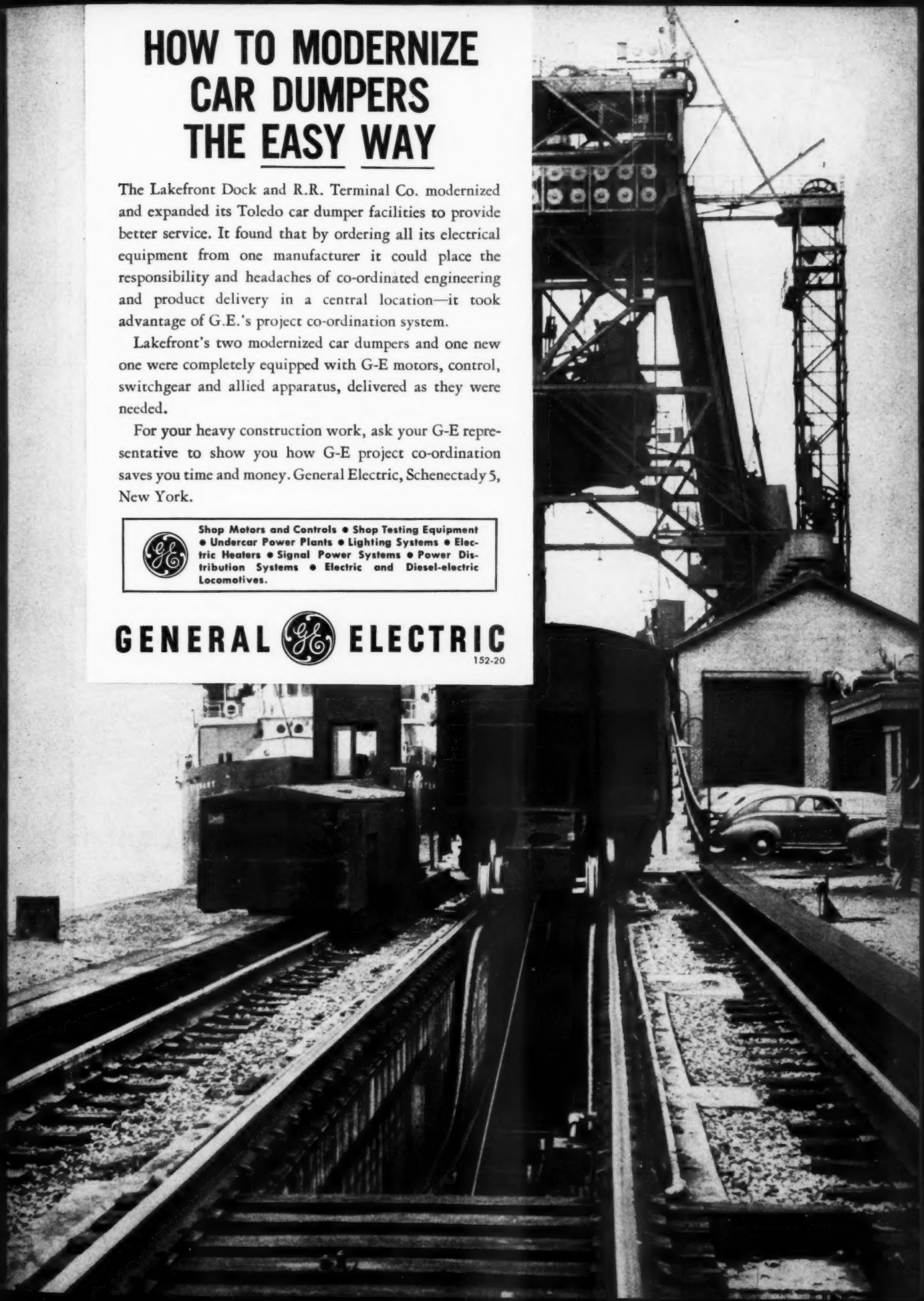
Lakefront's two modernized car dumpers and one new one were completely equipped with G-E motors, control, switchgear and allied apparatus, delivered as they were needed.

For your heavy construction work, ask your G-E representative to show you how G-E project co-ordination saves you time and money. General Electric, Schenectady 5, New York.

Shop Motors and Controls • Shop Testing Equipment • Undercar Power Plants • Lighting Systems • Electric Heaters • Signal Power Systems • Power Distribution Systems • Electric and Diesel-electric Locomotives.

GENERAL ELECTRIC

152-20



No. 270 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Difficult Decisions

June 1, 1951

Dear Readers:

In bringing you each month information on developments of interest to engineering and maintenance officers the editors of this magazine are sometimes confronted with knotty problems of judgment. In coming to decisions regarding these matters we can't expect to achieve infallibility but at least we can aim for it. And maybe sometimes we're on the right track when we don't appear to be on the basis of superficial considerations.

Let me explain what I mean by citing a problem that is now before the staff. Recently a revolutionary type of snow-fighting equipment was developed, concerning which detailed information has not been made available generally. Should an article on this equipment be published now, when snow-fighting is anything but a topic of thought or conversation among our readers, or during the fall or winter months when the subject would seem to be more timely? On the other hand publication of the material now, while it might appear ludicrous to some, would give interested readers time to acquire one or more units of the equipment for use next winter. This would be out of the question if we were to wait until the snow begins to fly before publishing the article.

Another example of a problem of editorial judgment is the extent to which attention should be given in our pages to developments in foreign countries. Because of basic differences in practices and conditions abroad as compared with those in this country, foreign developments are often not adaptable directly to our needs. Frequently, however, it is conceivable that variations of them might prove useful here. At the very least it is logical to assume that our readers will be interested in knowing how problems comparable to theirs are handled in foreign lands. It is reasoning of this sort that leads us from time to time to tell you of some practice or equipment that is proving of value on another continent,

The two examples cited are not necessarily typical but they serve to illustrate the point. Such questions as whether a particular development should be "covered," how much space it is worth, and what articles should be given priority when there is a surplus of material available for a particular issue—these and many others arise dozens of times each month. In answering them we have one thought uppermost in mind—the interests and welfare of our readers and of the industry for which they work.

Yours sincerely,

Merwin H. Dick

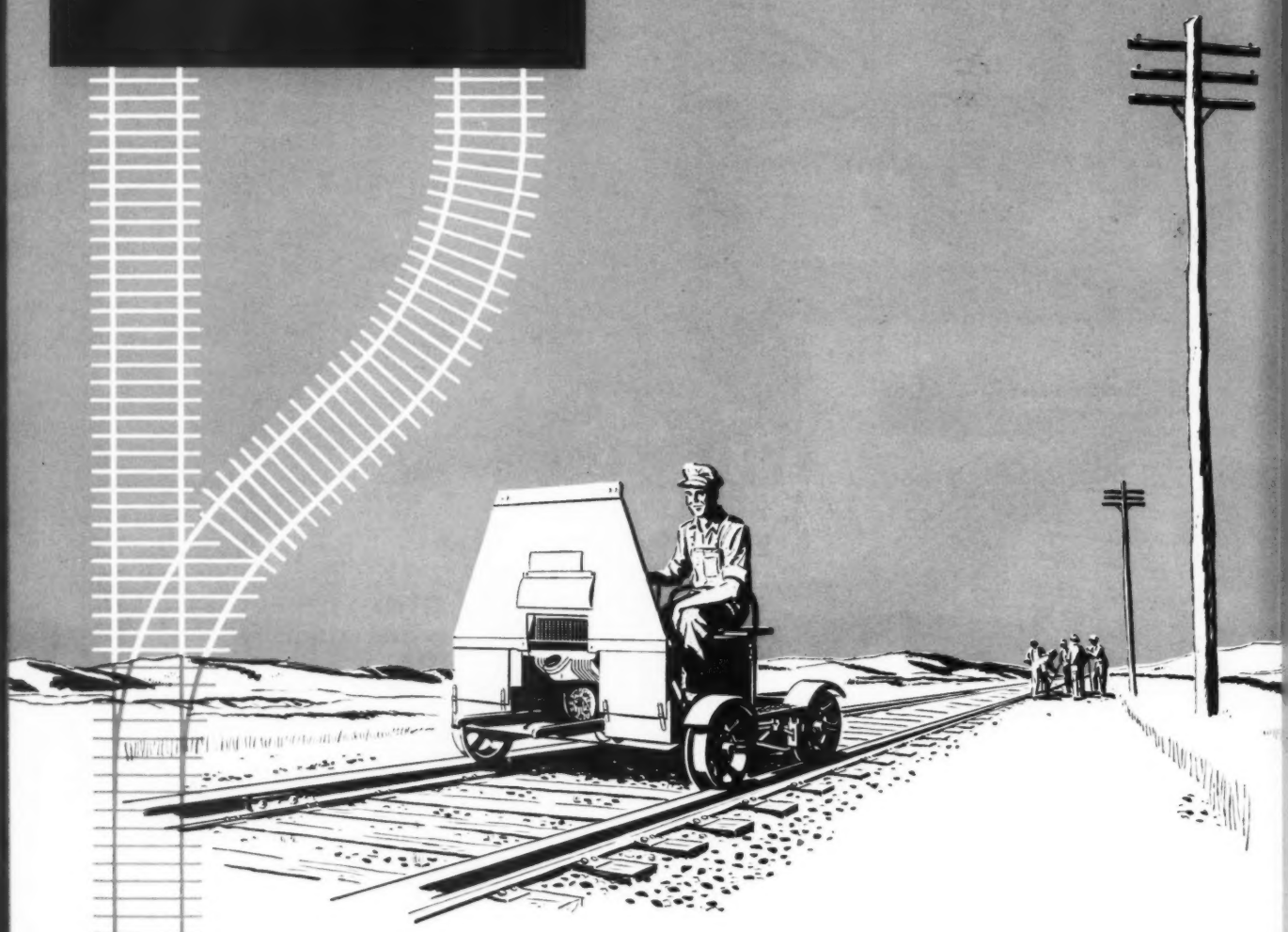
MHD:ag

Editor

Fairmont

RAILWAY MOTOR CARS
AND WORK EQUIPMENT

. . . the scout car of the railways!



In policing the railways, the inspection car performs one of the most vital roles in rail maintenance—and for this reason Fairmont has devoted much of its time and energies to the development of better, more efficient methods of rail inspection. The Fairmont M19 Series F pictured above, for instance, employs the dependable 5 to 8 horsepower Fairmont roller bearing engine which assures improved performance and simplified maintenance. Its new engine stabilizer provides vastly improved riding qualities and its four wheel brakes assure the maximum in safety. Strongly constructed throughout for dependability, it is, in every way, a typical Fairmont product—designed, built, and field-tested for performance *on the job.*

Performance
ON THE JOB COUNTS

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 West Monroe St., Chicago 3

New York 7,
30 Church Street

Washington, D. C., 4
1081 National Press Bldg.

Cleveland 13,
Terminal Tower

Portland 5,
514 Terminal Sales Bldg.

1204 Russ Bldg.
San Francisco 4,

Los Angeles 17,
816 West Fifth St.

Dallas 4,
2909 Maple Ave.

James G. Lyne, *President*, Samuel O. Dunn, *Chairman Emeritus*, J. S. Crane, *Vice-President and Secretary*. C. Miles Burpee, Harry H. Melville, C. W. Merriken, John R. Thompson, *Vice-Presidents*. Robert G. Lewis, *Assistant to President*. Arthur J. McGinnis, *Treasurer*. Ralph E. Westerman, *Assistant Treasurer*.

Subscription price in the United States and Possessions, and Canada, 1 year $2; other countries in the Western Hemisphere, 1 year $5; all other countries, 1 year $7. Two-year subscriptions double the 1-year rate. Single copies, 50 cents each. Address Robert G. Lewis, Assistant to President, 30 Church Street, New York 7, N. Y.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.), and is indexed by Engineering Index, Inc.

PRINTED IN U.S.A.

VOL. 47, NO. 6 JUNE, 1951

SPRAYING Nalco H-170-B from Illinois Central Spray Car in the Illinois Central Yards, New Orleans, Louisiana. Note tall, hard-to-kill grass.

AFTER Nalco H-170-B application, weeds and grasses reached by the spray are dead. H-170-B will also inhibit regrowth here.

Nalco H-170-B WEED and GRASS CONTROL

Controls Tough Johnson and Bermuda Grass on the ILLINOIS CENTRAL

TOUGH, hard-to-kill grasses, such as Johnson and Bermuda grasses, are controlled with Nalco's powerful new formula, H-170-B. Combined with its top killing action, H-170-B penetrates extremely rapidly and causes extensive root-kill which cuts down regrowth to a great extent.

Despite its potent weed-killing action, H-170-B is safe to use where livestock may be grazing, and it will not contaminate water supplies. Low volatility makes storage safe and eliminates fire hazards while spraying. Application may be made with any type of sprayer.

Full details on Nalco Weed Control and the availability of Nalco Spray Cars is available promptly from your Nalco Representative, or direct from Nalco.

Congratulations to the ILLINOIS CENTRAL on 100 YEARS of PUBLIC SERVICE

NATIONAL ALUMINATE CORPORATION

6191 West 66th Place • Chicago 38, Illinois

In Canada: Alchem Limited, Burlington, Ontario

THE Nalco SYSTEM . . . Serving the Railroads through Practical Applied Science

Enterprise—

Needed to Assure Progress in Maintenance

Nothing is so necessary to the prosperity of an industry, such as the railroads, as a spirit of enterprise or personal initiative on the part of its administrative and supervisory personnel. People with this spirit, among other things, are never satisfied with the way work is being done. They are forever searching for or trying to develop new ideas that will enhance the effectiveness of their own efforts or those of the people working under them. Remove from an organization all men with the spirit of enterprise, and progress stops immediately.

It is easy to tell if the spirit of personal initiative is lacking in yourself or your organization. Look around you and compare this year's practices with those of the year before. For instance, have any new "wrinkles" been introduced in your rail-laying gangs? Can you point to any improvements in your tie-renewal or track-surfacing operations? Are you trying anything new this year in the way of roadbed stabilization? Have any significant advances been introduced recently in your standards of track construction? Has anything been done lately to enhance the effectiveness of your bridge and building gangs?

If it is found necessary to answer such questions consistently in the negative it would seem that an unhealthy situation exists. To make this statement is not to advocate that maintenance forces be kept in a constant state of turmoil by frequent, perhaps ill-considered, changes in methods or practices; improvements must necessarily be tested and chosen with care and then integrated into the existing setup in such manner as to avoid throwing it off balance or causing confusion or inefficiency. However, the danger is more likely to be in the other direction, that is, that the attitude toward improvements will be one of extreme caution rather than hastiness based on snap judgment.

There is no escaping the fact that every employee of supervisory or higher rank in the maintenance department has the responsibility of proposing or aiding in the development of improved practices. A supervisor of track, for example, would be making a mistake if he were to take the position that he is free of this responsibilitiy, and that it rests primarily on the shoulders of his superiors. Higher maintenance officers, on the other hand, would be making an equally serious mistake if they were to depend primarily on their subordinates, on manufacturers and on the research program of the American Railway Engineering Association for the development of improved practices, devices or machines.

The idea of free enterprise—of individual initiative—is the foundation of our economy. The profit motive is there regardless of whether a man is in business for himself or works for a large corporation such as a railroad. If the latter, it is the ideas he has for improved practices that help to assure promotions for him, and to enhance the economic security of himself and his family by promoting the profit-making potential of the company for which he works.

INDUCEMENTS—

For Trackmen to Become Foremen

REPORTS indicate that the 40-hr. work week, along with the higher hourly rates of pay accompanying it, has made it easier for the railroads to obtain productive workers on the sections. But it has not had the same effect with respect to the problem of getting trackmen to aspire to the position of foremen, particularly when the promotion involves moving some distance away, such as to another roadmaster's territory. Typical comments made when explaining this attitude are: "I do not want to go that far away," or "I like it here," or "There is not enough difference in pay to make it worthwhile." These expressions may seem like the lame excuses of men lacking in ambition, of immature youths, or of men uninterested in following railroad work as a career. But should these utterances be accepted as final in indicating a lack of interest in promotion, or are there procedures and arguments available that will cause those taking this attitude to reconsider their position?

The responsibility of selecting and training men as foremen, and of getting them to accept promotion, rests primarily with the roadmaster and secondarily with his superiors. It is the roadmaster who must be on the alert for men with a foreman's abilities. When such a man is found, that is, one with sufficient education for handling the necessary reports, with the mechanical bent required for coping with mechanical equipment, and with the ability for getting along with and directing fellow workers, the roadmaster can spark the ambition of this man by asking him about himself, discussing the work with him and inquiring as to his views on how it should be carried out. The very fact that the roadmaster shows this interest will not only feed the employee's ego in being noticed and help to fire his ambition, but will also make him more observant of his work, the reasons therefore, and how it can best be done. Also, within the limits of union agreements, the roadmaster can encourage the prospective foremen to bid for higher rated positions with the knowledge that he will have the full cooperation of the roadmaster if he should get the promotion.

Policies established by management also have a great bearing on motivating men to aspire to the position of foremen, particularly as they apply to the relative rates of pay of foremen and trackmen. Formerly, there was a reasonable differential in the monthly pay of these two classes of employees. But, in the pay increases that have been given to employees in recent years, foremen generally have received the same cents-per-hour raises as trackmen, with the result that the relative pay differential has been narrowing. This trend has had a definite dampening effect on the desire of trackman to become foreman. Some railroads may want to review this pay incentive to see that a proper proportion is restored.

MARINE PILES—

Adhere to Specifications for Long Life

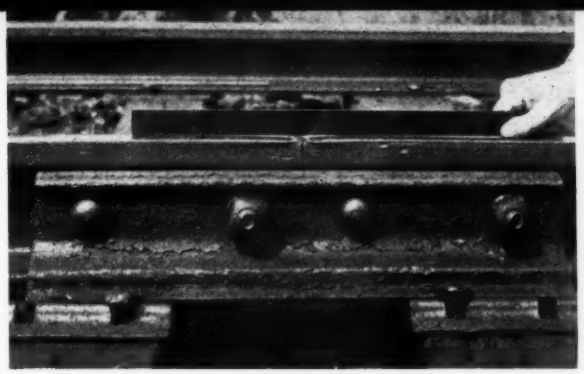
PILES used in coastal waters subject to marine borer attacks must be well treated with the right preservative, properly handled during construction and adequately inspected by competent, experienced inspectors. Unless such care is taken, those bogeys—Teredinidae or Limnoria—will surely cause early failure of the structure in which the piles are used.

Certainly, everyone concerned with the problem knows these things, but the American Wood Preservers' Association, meeting in convention recently, pointed out that "during the past eight years, preservatively treated piles in more than a score of marine structures have **prematurely** failed." According to good authority, all but one of these could very easily have been avoided if the specifications for treatment and handling had been checked by a competent inspector.

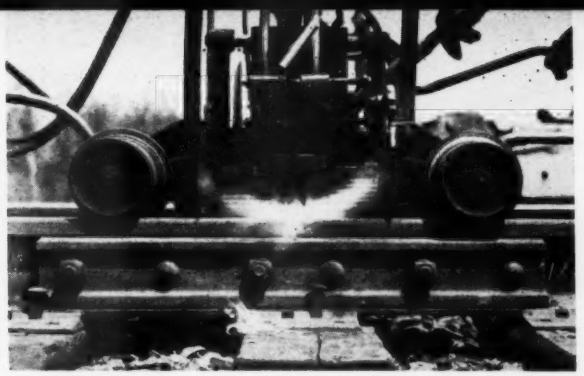
Service records, compiled for many years, have brought out two significant facts, among other things, about piles driven in waters infested with marine borers: (1) Untreated piles can be expected to last only about six months; and (2) creosote, when properly used, has been the most efficient preservative known for providing protection for marine piles. Such facts have been given wide publicity by engineering societies and trade associations. But in spite of such publicity and carefully prepared specifications covering the proper handling of treated piles, there are many records of premature failures attributed to improper care in construction and inadequate maintenance later.

To forestall one type of these failures, the A.W.P.A. frequently stresses the fact that "treated piles must not be dapped in the field for sway bracing". If they are dapped, such piles become no more resistant to borers than those which have had no treatment. But failures continue to occur from such poor practices. To preclude another type of failure, it is often pointed out that pile cutoffs should be protected in the manner prescribed by specifications, to wit: brushed liberally with two coats of hot creosote, followed by the application of a coat of coal tar pitch. If not so protected, destructive fungi can be expected to destroy all of the untreated wood for 10 or 12 ft. down from the top—within 12 years—just like they did in a recent costly failure.

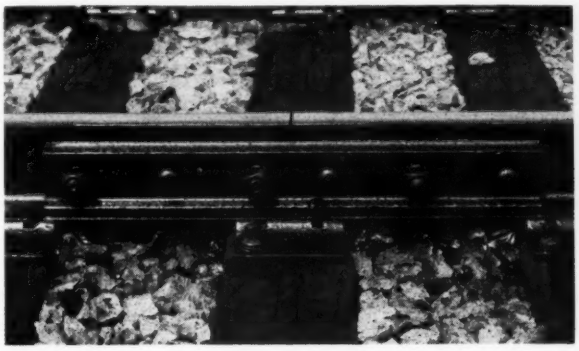
Where failure is so certain if specifications and care are disregarded, is it not pure folly to fail in providing competent inspection of materials, treatment and handling? For until such inspection assures that specifications are followed implicity, marine structures will surely continue to fail prematurely.



Wear and tear on joint bars due to impact at battered joints . . .



. . . can be reduced materially by heat treating the rail ends



Strength of a joint is bolstered by use of a three-tie support

Oversize bars provide a tight fit at the fishing surfaces

Rail Joint Maintenance—

What Points Need Emphasis?

By G. M. MAGEE

Research Engineer, Engineering Division
Association of American Railroads

The problem of deciding what policies must be followed in maintaining rail joints for maximum economy and safety is one that has long baffled maintenance men. Mr. Magee's views on this subject are backed by extensive knowledge of the performance of rail joints in service gained largely through scientific studies. This article is adapted from an address presented before a recent meeting of the Maintenance of Way Club of Chicago.

• There are three principal points with respect to rail joints which we have to consider. These are impact, strength and safety. I would like to have you think of each of these separately in relationship to the problem of determining the most effective and efficient maintenance measures for each.

In my opinion control or minimization of impact at a rail joint is the most important problem to be solved. This was impressed upon me last summer when we were inspecting the installation of asphalt-ballasted track on the Illinois Central near Manteno, Ill. One rail length and the two half rail lengths directly opposite each other contain several moderate-sized wheel burns. Each year for several successive years this particular panel of track has become low and required resurfacing due to the impact effect from these burns. Impact at a rail joint shortens the life of the joint bars, requires increased surfacing costs at the joint ties, and increases the rate of wear of the joint ties.

Heat-Treating Rail Ends

One very effective means of controlling impact perhaps need hardly be mentioned because it is now so well recognized. This is the use of heat-treated rail ends. The service tests carried out for a period of 10 years on the A.T.&S.F. and the Pennsylvania for the Rail committee of the American Railway Engineering Association clearly demonstrated the advantages of heat-treated rail ends in reducing the batter and resulting impact at the rail joint. With heat-treated rail ends not only did the rail joints maintain their surface better, but the rate of wear of the fishing surfaces on the joint bars was materially less, a circumstance we had not anticipated. Our profile measurements have indicated that with the use of heat-treated rail ends it

will probably not be necessary to do very much if any building up by welding. However, careful surface grinding at intervals to level off the hump that forms from the hardened steel is certainly very desirable.

It is very important to maintain a good fit of the joint bars within the rail ends. If the joint bars become worn at the fishing surfaces they will not hold the rail ends at the same height and this, of course, results in rail-end batter and impact. It is, therefore, necessary that worn joint bars be replaced with new or reformed bars which should be over-size if necessary to provide a tight fit at the fishing surface. It is especially important to check on the wear of the joint bars before welding or hardening the rail ends because frequently when worn bars are replaced it will be found that only grinding of the rail ends is necessary to restore a smooth running surface at the joint.

Rolling-load machine developed at the University of Illinois for testing joint bars

Strength of Rail Joints

The next point to consider is the strength of the joint. Many engineers have the impression that a pair of joint bars is as stiff and strong as a full rail section, but this is not true. Limitations of clearance imposed by the fishing surfaces in the vertical plane and by the rail web and wheel flanges in the horizontal plane make it physically impossible to design the rail joint to be as strong as the rail. The design of joint bars commonly in use is such, however, that they are sufficiently strong in general to withstand the wheel loads to which they are subjected without an undue number of failures. It is, of course, common knowledge that when failure of joint bars does occur the type of failure is almost always a progressive fracture originating at the top fishing of the joint bar at or near the joint gap.

The flexural or bending stress at the top fishing surface varies from compression to tension half as great and at the bottom fishing surface from tension to compression half as great. Ordinarily, from the range of flexural stress in the bar it would be expected that failure would be more likely to originate at the base of the bar. The high contact bearing pressures between the rail end and the top of the bar in combination with the flexural stress evidently produces a tearing stress sufficiently high to start a progressive fracture. Generally, therefore, this is the area that should be most closely inspected for joint-bar failures which would destroy the supporting strength of the rail joint.

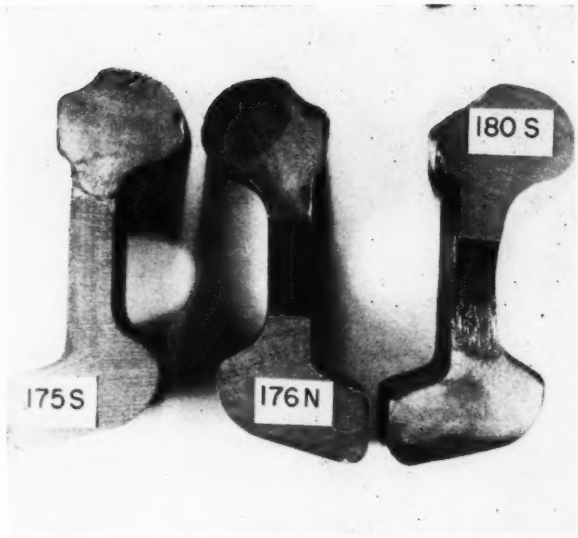
What About Bolt Tension?

It is also important in maintaining the strength of the rail joint to maintain an adequate bolt tension. Loss in bolt tension according to our tests is not due to the nut backing off of the bolt so long as there is any tension remaining in the bolt. Loss in bolt tension is due principally to wear at the fishing surface which permits the joint bars to move closer together thereby releasing the applied tension. Measurements have been made of the rate at which this wear occurs and these have showed, in general, that the maximum amount of wear at any one joint in a one-year period would be about .03 in. Laboratory tests have shown that a bolt tension of at least 5,000 lb. is necessary to insure that the rail joint will develop its full supporting strength. Accordingly, the A.R.E.A. recommended specification for spring washers stipulates that the washer, when released .03 in. from an initial pressure of 20,000 lb., will still maintain a pressure of at least 5,000 lb.

It is necessary, if we are to obtain the full-supporting strength of the rail joint, that fishing-surface wear not be permitted to become excessive. Fishing wear on the joint bar occurs near the middle of the top of the bar and towards the ends on the base of the bar. When wear develops the rail joint has a tendency to pull the rail ends down and form a dip at the joint; thus, the rail joint, instead of helping hold the rail ends at the same plane, is actually working to pull the rail ends low or out of the level plane. The importance of replacing worn joint bars is obviously of great value in contributing to the supporting strength of the joint.

Since we know that there is an added load at the rail joint due to some impact effect and that the rail joint is not as strong as the full rail section there is one other means that we can take to help bolster the strength of the joint. That is to space the joint ties more closely together and tamp them more firmly than the remaining ties. Personally, I favor placing one tie immediately under the joint gap with adjoining ties each spread as closely as possible and still leave the necessary clearance for tamping purposes. There are some who feel that a 36-in. joint bar is required to obtain the advantages of this tie arrangement, but that is not true. The so-called three-tie-supported joint is just as effective in bolstering the strength of the four-hole joint as it is for the six-hole joint. However, the longer joint bar does have an advantage in reducing the rate at which fishing-surface wear develops.

Thus, to obtain the full-supporting strength of the rail joint it is



Fractures of 115-lb. RE joint bars produced in laboratory

Rail failures within joints are becoming increasingly serious

necessary to use a well-designed joint bar of proper metallurgy and heat-treatment, maintain adequate bolt tension, replace bars when they become worn, and secure all benefit possible from closer spacing and more firm tamping of the supporting joint ties.

The Problem of Safety

The third characteristic with respect to rail joints which I have mentioned is safety. Fortunately, most joint-bar failures develop as progressive fractures which are detected before complete failure occurs. Also, it is seldom that both bars of a joint fail simultaneously. However, this does sometimes occur or bolts become sheared or broken permitting the rail joint to open an excessive amount. There is also another type of failure within the rail joint which has become increasingly serious in recent years, namely, bolt-hole breaks or corrosion-fatigue cracks in the upper fillet at the rail ends. In cold weather a portion of the rail end is likely to break out suddenly from bolt-hole or fillet cracks resulting in a definite safety hazard to trains.

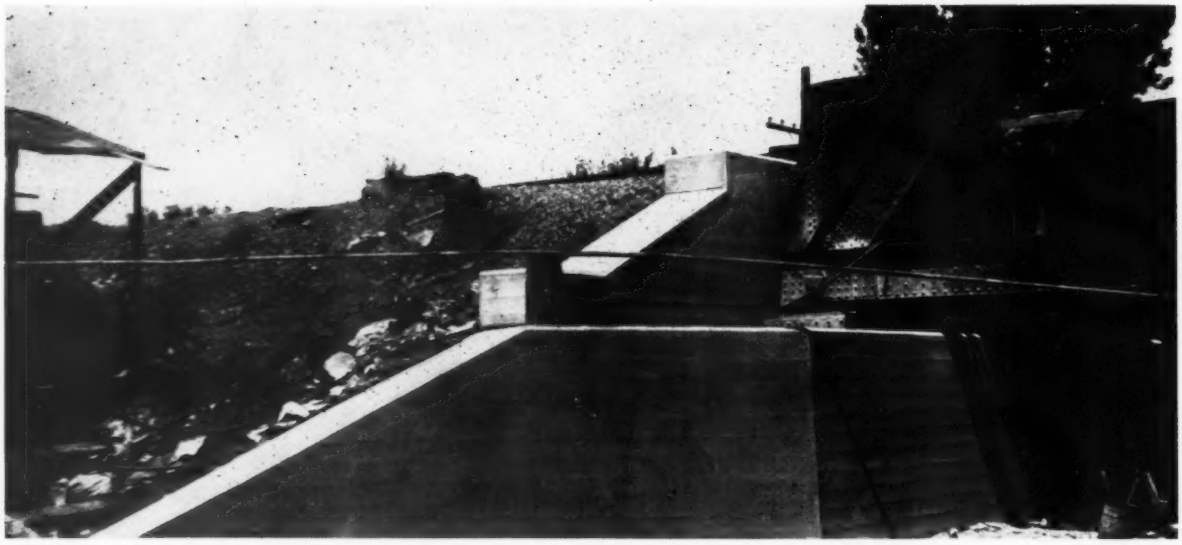
The possibility of progressive fractures developing in joint bars requires careful inspection on the part of the track forces to the end that these cracks may be detected and bars removed before complete failure occurs.

My observation has been that broken bolts, especially where all bolts break in one end of a rail joint, are usually the result of the bolts being bent back and forth by the opening and closing of the joint gap When a sudden drop in temperature occurs and the rail contracts those rail joints open first which have the lowest slippage resistance, and they will continue to open until the rail web comes to a solid bearing on the bolts. The bolts then act as beams supported at each end by the joint bar web and loaded at the middle by the rail web. Bolts are not very strong as beams and may easily become bent before they develop sufficient added resistance to cause other rail joints to begin slipping. Ordinarily, the maximum joint gap opening when bolts come to a solid bearing is ⅜ in. Track forces should be cautioned to observe rail joints in cold weather which have openings beyond this amount because it is certain that joint gaps of as much as ⅝ or ¾ in. indicate a very severe bending of the track bolts.

Over-tightening of track bolts increases the spread between maximum and minimum slippage resistance of the rail joints, thus placing a bigger bending load on the track bolts that come to a solid bearing on the rail web. Careful attention to obtaining a moderate bolt tension will be helpful in preventing broken bolts. Also, in our new A.R.E.A. joint-bar designs we have brought the web of the bar as close to the web of the rail as possible to shorten the span and thus increase the bending strength of the bolt. Attention to proper rail anchorage to insure that there is no accumulation of expansion in particular areas, especially summits, will also be helpful in preventing excessive expansion and bending of bolts.

Control of corrosion of the rail web within the joint bar limits is a difficult problem. We have conducted tests over several years with various types of rail-joint lubrication and have not as yet found a solution to this problem with which we are entirely satisfied. Based upon the results of our tests to date we believe that a brushed-on lubricant of petrolatum or similar material, protected with plugs at each end of the joint, will give good protection against corrosion under ordinary circumstances for six to eight years or perhaps longer. At areas where there have been indications of failures from bolt holes or fillet cracks consideration should be given to periodic testing of the rail joints with supersonic devices of the Sperry or Audigage type. The presence of what might ordinarily be considered small cracks at the bolt holes or in the upper fillets may result in the sudden popping out of the rail end in cold weather, with resultant possibility of train derailment.

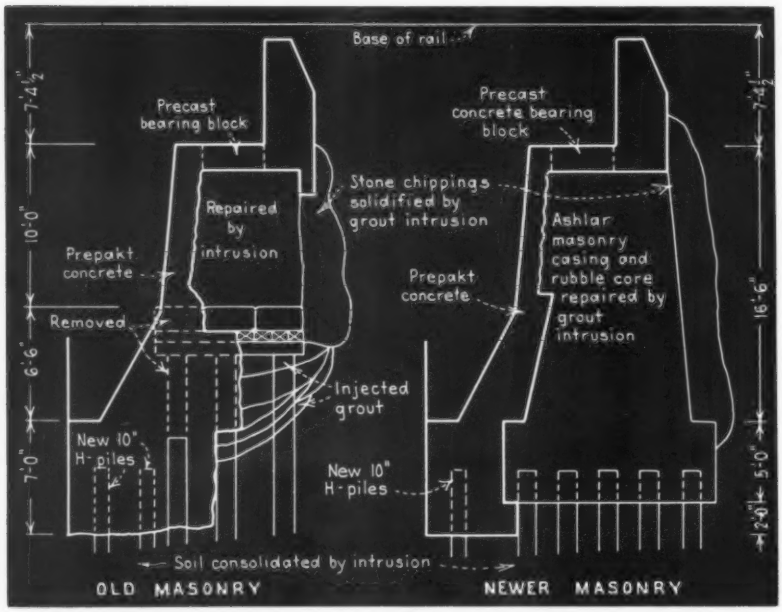
Thus, due consideration in rail-joint maintenance to assure safety requires careful inspection for beginning cracks in the bars, attention to prevent broken bolts, and suitable corrosion protection of the rail ends, followed up with inspection with supersonic equipment where circumstances indicate this to be desirable.



Downstream view of a stone masonry bridge abutment on the Union Pacific after rehabilitation

Old Abutments Made Good as New

When the stone masonry of several bridges had progressively deteriorated to the point where repair work was called for, the Union Pacific rehabilitated and underpinned the structures with pressure grouting and Prepakt concrete. Further stabilization was assured by the driving of steel H-piles and the solidification of the underlying soil

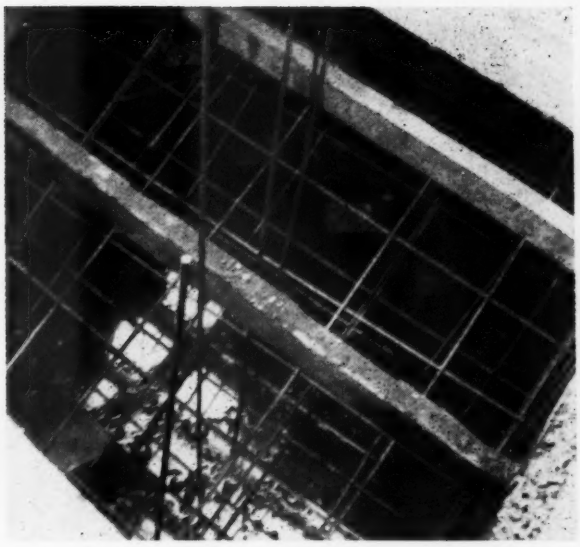


Typical cross sections illustrating nature and extent of repair work being carried out by the Union Pacific for restoring deteriorated and undermined stone masonry

• Freezing and thawing, high water, floating ice and debris, and weather erosion all take an annual toll of masonry piers and abutments, and those on the Union Pacific are no exception. Built at a time when stone was a common masonry material, and the conventional design called for an ashlar masonry casing with a rubble masonry central core cemented together with a lime mortar or with natural cement, and all setting on a timber grillage over a pile foundation, these piers and abutments have already given a remarkable performance. But inspections several years ago revealed that the passage of time was having its effect: seepage had deteriorated the abutment interiors and mortar joints, some stones were no longer properly bedded and were developing cracks from increased traffic loads, and, in a few instances, abutments were settling and even tipping forward due to scour and undermining.

To correct this condition and rehabilitate these structures, the Union Pacific employed a method combining the advantages of pressure grouting and Prepakt concrete that not only stabilized the underlying soil and substantially relieved the earth pressure from behind the abutments, but also

1 Steel H-piles were driven in front of abutment, underlying soil was grouted, and a trench was excavated below footing



2 H-piles were capped with welded steel plates, reinforcing bars were placed, and trench was filled with stone aggregate

3 Intrusion grout containing sand was pumped through pipes into the aggregate mass to make Prepakt concrete

4 Stone on abutment face was chipped down to sound material and a reinforced concrete facing with buttress constructed

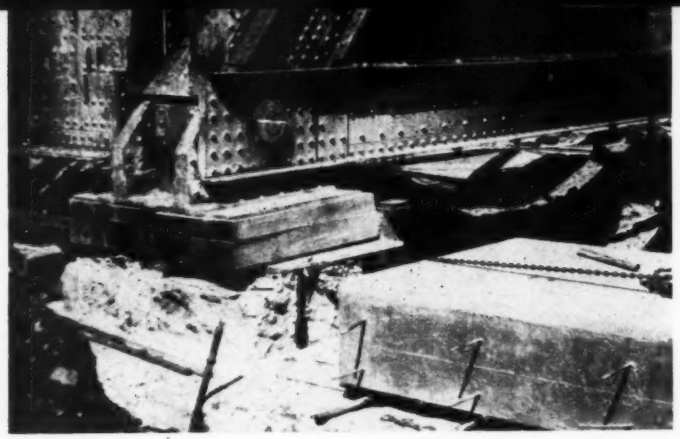
solidified the masonry and gave it a strength equal to if not greater than it had originally.

A typical rehabilitation project involved the east abutment of truss-span bridge No. 86.49 which carries the double-track main line of the U. P. over the Loup river near Columbus, Neb. Scouring action had exposed not only the footing and timber grillage of a large portion of this abutment, but also had undermined a portion of the underlying soil beyond the outer row of foundation piling. Also, because of the sandy nature of this soil, it was feared that some soil had run out from behind the abutment, leaving a void.

Originally the abutment had been built with wingwalls for a single-track line, and consisted of a stone-masonry shaft, 10 ft. high, setting on a stone-masonry footing 1 ft. 6 in. thick. The footing rested on a grillage of 6-in. by 12-in. timbers supported by three rows of piling driven at about 3-ft. centers and capped. When the line was double-tracked, the abutment was extended at the south end and a new wingwall was constructed at that end. The extension to the abutment is comprised of a stone masonry shaft, 16 ft. 6 in. high, standing on a concrete footing 5 ft. thick, which is supported on five rows of piling driven at 2-ft. 6-in. centers and embedded 2 ft. into the footing. Since the shoes of the new double-track truss were 30 ft. 6 in. apart between center lines, one shoe was on the old masonry and the other on the extended masonry.

Before starting rehabilitation work on this abutment, the railroad drove a 100-lb. rail, 39 ft. long, as a test pile to determine the bearing value of the soil. From this test, it was developed that a pile driven to a point 44 ft. below the base of rail would provide adequate bearing. The railroad then drove a row of new 10-in. 42-lb. steel H-piles, 20 ft. long, at 3 ft. centers and on a line 2 ft. 9

5 Wall facings were carried up to a point below bridge seat, then top course of stones and backwall were removed



6 After truss was jacked up, crumbling stone bearing area was removed, then precast concrete bearing blocks were placed

in. in front of the concrete footing. An additional row of H-piles was driven adjacent to the footing of the original masonry. By using a follower, these piles were driven to place their tops about 26 ft. 10 in. below the base of rail, which is the same elevation as the tops of the piling embedded in the concrete footing. Other piles were driven in front of both wingwalls.

A cofferdam of wood sheet piling, 16 ft. long, was built about 5.5 ft. in front of the abutment and wingwalls, and extended around the ends to seal off the water. The sheet piles were driven to place their tops 17 ft. below the base of rail, or just above the standing water level.

Injector pipes were driven at various angles into the soil beneath the grillage and through the concrete footing to depths of from 10 to 13 ft. Cement grout was forced through these pipes to consolidate the underlying soil and to enhance its bearing value. Cement grout intrusion pipes were also jetted to a depth of 20 ft. into the embankment behind the abutment for a distance of about 40 ft. from the backwall to solidify the soil and to relieve the pressure on the abutment. From the face of the abutment, and on 2-ft. vertical and horizontal centers, holes were drilled into the stone masonry, and grout forced through them. Some of these holes were extended entirely through the structure for the purpose of consolidating the stone chips and backfill behind the masonry, while others were stopped just short of full penetration for reintegrating the stones of the masonry itself.

With the abutment thus stabilized, work was directed toward the underpinning of the structure with Prepakt concrete. This work included the dewatering of the enclosure within the cofferdam, the trenching and tunneling of sections from 3 to 4 ft. wide under the abutment, the removal of the upper portion of the outer and middle row of piles under the older masonry as well as the timber grillage within the confines of each section, and the filling of these sections with Prepakt concrete suitably reinforced. The trench sections extended from the cofferdam to a short distance beyond the middle row of piles under the older masonry and to the outer row of piles of the concrete footing of the abutment extension. As the concrete of one section was hardening, another section was being prepared a few feet away so that there was always adequate support under the abutment.

The faces of the abutment and wingwalls were then cleaned by sand-blasting and by chipping to sound stone, after which steel dowels were anchored on 18-in. centers into the masonry. Other steel reinforcing was placed and forms constructed for a new facing of thin-wall Prepakt construction. This facing was carried up to a construction joint about 3 ft. below the bridge seat. The wingwalls were similarly refaced.

Following this, the backwall and the top course of stone of the bridge seat were removed except for the bearing areas under each truss. The trusses were jacked up, the old stone bearing areas were removed, and new precast bearing blocks were set in and leveled with relatively dry grout. The trusses were then brought to a bearing on the blocks and anchored to them. A new reinforced concrete bridge seat and backwall, formed monolithically with the top of the front facing, was then constructed. The new bridge seat surrounds the precast bearing blocks which had been provided with projecting reinforcing bars for unifying the construction into a monolithic whole.

For the most part, this work was done during the winter months. The railroad drove the H-piles during the late fall of the year and the remainder of the work was carried out under contract by Intrusion-Prepakt, Inc., Chicago, with a force of about 26 men and a foreman. The equipment used on this work included a wheel-mounted air compressor of 315 c.f.m. capacity, an intrusion pump, a rock washer, mixing tanks, 50-ton hydraulic jacks, and assorted air tools, including jack hammers, paving breakers and chipping hammers. The Prepakt concrete is made by first placing coarse aggregate in the forms. Intrusion grout containing sand is then pumped into the aggregate mass to make Prepakt concrete. The coarse aggregate used in this work was graded from ½ in. to 2 in. in size. The grout used in this work is known as Intrusion grout. In addition to portland cement and water, this grout contains the admixes Alfesil and Intrusion Aid which increase flowability at low water-cement ratios, hold the constituents in suspension until the fluid has hardened, increase the affinity of the grout to aggregate and masonry surfaces, and eliminate setting shrinkage.

All of this masonry-rehabilitation work on the U. P. was carried out under the direction of W. C. Perkins, chief engineer, and L. P. Drew, assistant chief engineer, while W. F. Hart, division engineer, had charge of the field supervision, and B. E. Arnold, supervisor bridges and buildings, had direct charge in the field. The representatives of Intrusion-Prepakt, Inc., were C. J. Berkel, engineer, and R. D. Michael, superintendent.

Left—With the aid of this simply-constructed optical lining device, track can be "thrown" to an unwavering line, according to the inventor

Below—The sighting device for raising track consists simply of a four-power rifle scope mounted on a stand made of steel pipe and a wood block

How to Make Sighting Devices For Lining or Raising Track

By JOHN McMILLAN
Track Supervisor, Gulf, Mobile & Ohio
Springfield, Ill.

From an inexpensive rifle "scope", a few pieces of pipe, a rod or two, some special bolts and other metal parts, can be fabricated a device that will, according to the author, make any track foreman an expert track liner or surfacer

• Telescopes have often been used for surfacing and lining track, but they have usually been expensive. However, low-cost, simply-constructed sighting instruments—one for raising and another for lining track—have been developed on the Springfield district of the G.M.&O.

The device for use in raising track consists simply of a 4-power rifle scope mounted on a stand made of pipe and a small wood block. When used in place of a sighting block such as normally employed in raising track with a spot board, the telescope becomes the "peep-sight" and gives a clear view of the line on the spot board at distances well beyond the range of an unaided eye. Several advantages accrue from this fact. In the first place, it insures that the most desirable spot can be picked for setting the spot board. This eliminates the discouragement a foreman encounters when he stands beside his track, scanning the surface for the best high spot on which to place his spot board, only to find that it is beyond the point at which he can see the line on his board distinctly.

With a "surfacing scope" you do not have "to guess your way through short sags". Neither do you have to set up your board so often, thereby delaying your jack men and sometimes your tampers. Infrequent changes eliminate many mistakes in setting the spot board and make the new surface smooth and not merely a replica of an old surface on a higher plane.

If grade stakes are used, fewer are needed, since they can be set farther apart. Should a grade stake be knocked out or damaged, the line on a spot board at a distant stake can be picked out with a scope, thus eliminating the necessity of recalling engineers to reset the stake. Savings that can be realized from these important advantages soon pay for the rifle scope and the work of assembling its stand.

How To Make Stand

A stand, or holder of some sort, is required to keep the center of the scope lens at the same height above the top of rail as the top or sighting edge of the level board. In the surfacing stand illustrated in this article (above right and Fig. 1 next page), this distance is six inches. Incidentally, the sighting edge of the level board, to be most effective with telescopes, should be made sharp by fixing a piece of black-painted sheet metal to the board. This eliminates the blurring caused by bright sunlight being reflected from the wide top of the average level board or sighting block.

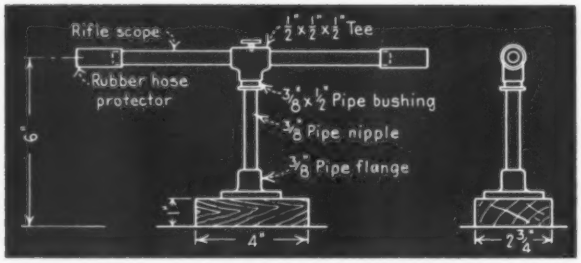
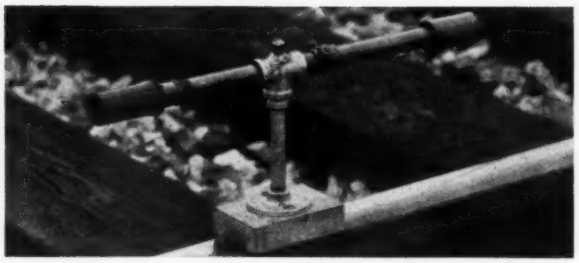


Fig. 1—Construction details of the track-raising instrument



One of the track-raising instruments made by Mr. McMillan

Fig. 1 shows the parts from which the stand is made. The way these parts are assembled is also indicated on the drawing except for a few cases. For instance, the pipe flange is fastened to the top of the wood block by two wood screws, ⅝ in. long. The pipe Tee into which the telescope is fitted is bored out on top and a tap with an inside diameter of ¼ in. is centered over the hole and brazed onto the Tee. The horizontal "run" of the Tee is then reamed to the outside diameter of the scope, so that, after the eyepiece and the lock ring are removed from the telescope, it can be pushed through the Tee. When it reaches as far as desired, a ¼-in. stove bolt that has been pointed slightly on the end is then screwed into the tap on top of the Tee to hold the scope in position.

The telescope used in the surfacing device illustrated in this article is a Weaver G-4*, 4-power rifle scope that retails for $9.75. It is 11½ in. long and about ¾ in. in diameter. In use it has to be focused to suit the eye of the individual operating it. To do this, start with the eyepiece backed out. Then turn the eyepiece until distant objects are sharp, then stop. The cross hair is not needed for surfacing and can be removed if desired. A 2½-in. piece of rubber hose should be placed over each end of the scope and pushed in ½ in. When the scope is not in use, stoppers should be placed in the hose ends to keep out dust. If a smaller field of vision is desired, use a longer piece of hose on the eyepiece. Finally, during rainy weather the scope should be covered or kept in a box provided for this purpose.

The optical lining device developed on the G.M.&O. is slightly more complex than the surfacing tool, but still simple enough to be assembled by hand. The advantages of using such a device are obvious. With the aid of a telescope that is stronger than the human eye and a vertical cross hair that is more accurate, track can be "thrown" to an unwavering, straight line. Furthermore the cross hair reference line eliminates the indecision of the liner that usually holds up the lining gang. This saves time and gets more work done—better.

The stand that supports the telescope, adjusts its position and holds it securely is shown in an accompanying detailed working drawing (Fig. 2). It consists essentially of four parts: (1) A rail clamp; (2) a framework base; (3) a main shaft, ⅝ in. by 25 in., pivoted on its lower end to the frame; and (4) a ⅝-in. pipe, one end of which slips over the upper end of the main shaft and the other end of which holds the sighting telescope in a U-shaped yoke.

The rail clamp is made of two 1½-in. by 1½-in. by 3/16-in. angles, 5¼ in. long, welded, facing each other, to the bottom bar of the frame so that their vertical legs are spread 3⅛ in. to fit over the head of the rail. In the middle of the right-hand leg, a 7/16-in. hole is drilled ⅞ in. below the top of the angle. A ⅜-in. tap is centered over this hole and brazed to the angle. A tee bolt, made by welding a ⅜-in. rod, 4 in. long, to the end of a ⅜-in. by 4-in. bolt threaded for 1½ in., is screwed into the top to clamp the angles to the head of the rail. A 3-in. line level is then fitted to the top of the angles, ¾ in. from the back end, using ⅛-in. by ¾-in. stove bolts. The heads of the bolts are countersunk into the bottom of the angles so they will rest flat on the rail head.

Framework Construction

To complete the frame, a vertical steel post is welded to each end of the base bar to which the rail clamp is attached. A horizontal steel strap is welded to each side of the posts at the top to hold them together and form a slot through which the main staff may rise and be moved laterally while being plumbed.

The main staff is pivoted at the bottom by a ¼-in. bolt, 1½ in. long, pinned through a strap-iron U brazed to the top of the base bar. The pivot hole in the shaft is centered ⅜ in. from the staff's bottom end. Since the center of the main staff at this hole must be on a vertical line passing through the base bar and the gage line of the rail, the U-strap must be brazed in a position to make this possible when the bolt hole in it is bored ¾ in. above the top of the base bar. To plumb the staff, it is moved to the right or left by a crank bolt extending horizontally from it to the right-hand post about 9¼ in. above the base. Details of the crank bolt and the knobs on the staff and post are shown in Fig. 2. When fastening the crank bolt to the knob on the main staff, the nut must not be drawn tight because there should be some play when the staff is moved. To help in this movement, that part of the bolt inside the knob should be filed smooth and oiled frequently.

Telescope Holder

Fig. 2, except for a few minor items, shows in detail the forked pipe that holds the telescope. For instance, the U-fork is fitted with two cone-point threaded bearings, the left one of which is slotted for a screw driver and the other fitted with a Tee-rod handle for hand manipulation. The cone points of these bearings fit into holes taper-bored into the sides of a bushing 1⅝ in. long and 1¼ in. in outside diameter that is reamed out to slide over the scope. This allows the scope to be rotated through a small vertical arc while sighting the rail.

The lower end of the fork pipe

*Made by the W. R. Weaver Company, El Paso, Tex.

is split upward 2½ in. A ¼-in. machine nut is welded on edge on each side of the split. The threads on the nut on the right-hand side of the split are bored out so that a ¼-in. bolt can be slipped through it and threaded into the nut on the left side of the slit. To give a pulling effect to this bolt, an offset is made in it ¾ in. from the threaded end, and a Tee rod is welded to the other end for hand turning. By means of this device the pipe and scope can be turned on the staff and clamped in any position desired.

To support the yoke pipe and telescope on the staff, a 1-in. pipe thimble is slipped over the staff and held in the desired position by a small Tee bolt threaded into the side of the thimble. Thus, the yoke pipe is supported to the thimble but is free to run in any way desired, then clamped in position to give a positive and continuous "bead" on a foresight. This thimble must have a true top face to permit the pipe and scope to turn accurately.

Setting the Cross Hair

With the telescope* fitted in the U-fork, all that remains to be done now is to set the cross hair. This should be done indoors. First, clamp the stand to a piece of rail, getting the line level on the rail clamp as true as possible. Next, with the crank arm, move the staff until it is perpendicular. Then weld a half section of 1-in. pipe, 3 in. long, to the main pipe 5½ in. down from the top of the fork. This will form a holder for an upper 3-in. line level. Drill the level at each end with a ¼-in. drill bit, shim it on one end until the bubble is in the middle, and then bolt it to the holder. This level should be horizontal when the shaft is perpendicular.

Next suspend a plumb bob from a line in a doorway in front of the scope and stand. If necessary, submerge the plumb bob in a glass of water to get it to hang free and still. Turn the U-fork and telescope on the shaft until the cross point of the hairs is on the plumb line, then clamp it in position. Now turn the scope in the bushing until the vertical cross hair lies on the plumb line. Move the scope up and down. The vertical cross hair should keep on the plumb line.

*In this case, a 6-power, Weaver G-6 rifle scope.

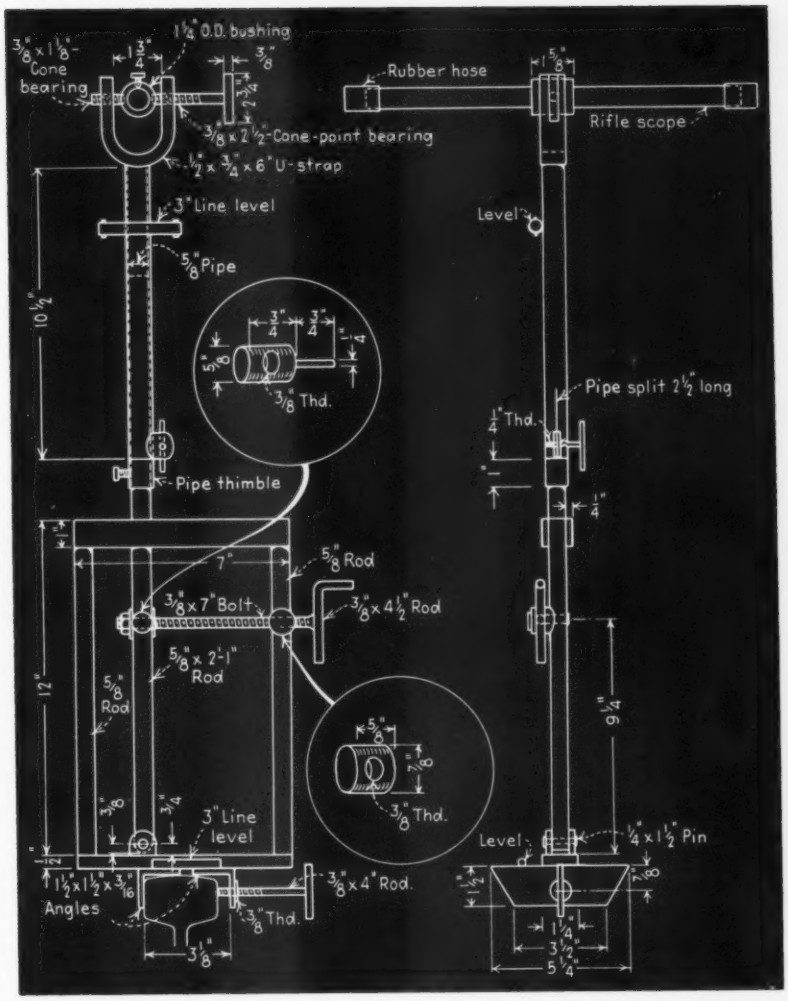


Fig. 2—Construction details of the optical instrument developed for lining track

If it does, tighten the set screw fitted into the bushing to hold the scope in position. If the vertical cross hair does not stay on the plumb line it will probably be because the scope-bushing bearings are not machined correctly. In such case they should be given to a machinist for correction.

How To Use Scope

To use the scope, set it on the rail as near a swing as possible and tighten the rail clamp. Plumb the staff by means of the crank arm and the upper line level. Move the scope up or down until you pick out the spot to which you want to line. Move the scope to right or left as necessary to place the vertical cross hair on the gage of the rail at that spot. Tighten the split-pipe clamp to hold the scope on that foresight. If necessary move the scope down to get the vertical cross hair on the rail where the track has to be moved. Sometimes in tightening the split-pipe clamp, the cross hair may be moved off the gage face of the rail just a little. To restore this small change a windage adjustment is available on the scope by which the vertical cross hair can be moved either way a notch at a time. However, do not use the cross hair adjustment if it can be avoided.

Finally, with the telescope so clamped that the cross hair is on the foresight, have the track shifted until the gage side of the rail fits along the cross hair at all points between the foresight and the instrument. When this has been satisfactorily completed, the instrument can be moved near the foresight and the lining operation repeated as often as is necessary to reline all the track that is out of alinement.

Tie Unloading Made Easy

With Special Cars

New York Central develops cars with swinging side stakes so that ties may be pushed off onto the ground instead of being lifted over the side, as necessary when unloading from gondolas. This article describes the cars and gives the results of a test made to determine their performance

With the work train moving at 5 m.p.h. . .

Unlike unloading from gondolas, no tie lifting is necessary; the ties are pried off pile and through side of car with bars

The steel side stakes, being hinged at top, swing outward, causing the crossties to drop vertically to the track shoulder

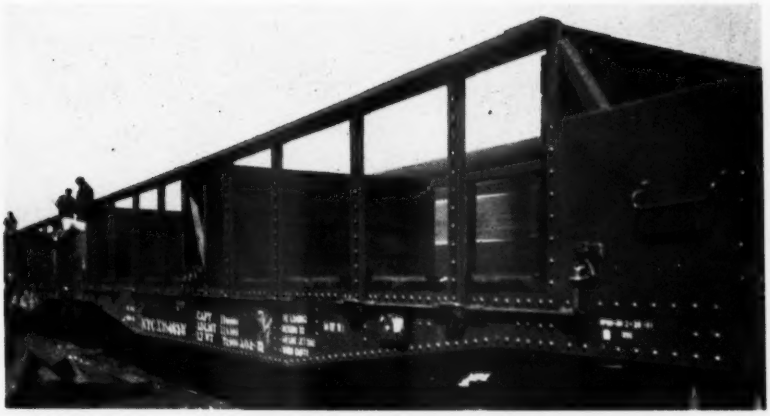
• As a means of facilitating the unloading of crossties and thereby not only reducing the cost of this work but also affording section forces more time to be devoted to other tasks, the New York Central has converted 10 container cars into work cars of a special design. Built with outward swinging side stakes, the cars permit the unloading of ties one at a time for proper distribution without any lifting required on the part of the men doing the unloading work. No equipment different from that ordinarily used in tie yards is required when loading ties into the cars, and only ordinary lining bars and long-bladed spades are needed for the unloading operation.

Each of the cars is divided into two compartments by a transverse bulkhead at the midpoint. Each compartment holds an amount of ties equivalent to about two and one-half tramloads as used at treating plants. The ties are placed longitudinally in two piles in the compartment. Each compartment will hold approximately 63 main-track ties or about 75 side-track crossties, totaling about 250 or 300 ties per car, depending on the type being handled. On each side of each car, at normal gondola car-side height, there is a top rail from which steel-angle stakes are suspended on hinges. These stakes are held in place at the bottom by locking rods and are so spaced that, when locked, they keep the ties from falling out. The locking arrangement consists of a steel rod bent to fit around the lower ends of two stakes and also to form a handle at one end. The handle is locked in place by a dog and a link. The stakes for each compartment are locked separately on both sides of the car; thus ties can be unloaded from either side as desired. Also the stakes are so spaced that the ties can be unloaded from one pile at a time.

Shallow steel skids, fastened transversely to the car deck, facilitate the removal of the sling chain when loading a tramload of ties into the car pocket at the tie yard. The skids also make it easier to slide ties from the bottom row of the tie pile when unloading.

To test the effectiveness of these new work cars, as compared with gondola cars, in reducing the cost of labor for distributing crossties, the road selected a section of track where ties had to be unloaded in connection with a ballasting job that followed a recent rail-laying program. On this track the tie renewals ran about 510 ties to a mile. When ties were unloaded from gondola cars, the labor cost approximated nine cents per tie, not including the cost of the work train or any other charges that might be applicable to a tie-distribution operation. When the same men were employed a few days later to unload ties from the special tie-unloading cars, the labor cost was less than two cents per tie. Since the ties can be pushed off of the cars with hand tools instead of being lifted, as necessary when unloading from gondola cars, there was less hazard of back and hand injuries, and the workmen

. . . section men pry ties off special cars



The top-hinged side stakes are held in place at the bottom by means of locking bars

In a test operation using the special work cars, crossties were distributed at a labor cost less than two cents a tie

Left to right—Work-train conductor; A. A. Keever, asst. dist. engr.; C. L. Nolan, asst. div. engr.; D. L. Pinkerton, asst. supv.; G V. Holm, supv.; and J. C. Ryan, supt. maint. equip.

were less fatigued after the distribution had been completed.

In this test, the ties were distributed in accordance with the normal practice of the N. Y. C. At the time that the rail was being laid, when the adzing of the tie-plate seats revealed the true condition of those areas, the track supervisor or his assistant made an inspection of the ties. A count was made of the number of ties that were to be renewed between each pair of telephone poles, and these figures were recorded. This was done so that the correct number of ties within these limits could be unloaded later. Each tenth pole is marked on this railroad so that its position within the mile can be determined.

Prior to the arrival of the ballasting gang, the condition of the crossties was checked again by a walking inspection, and the renewal count was adjusted accordingly. Ties were then unloaded from a slowly-moving work train by the section forces. The section foreman took a position between two cars of ties and divided his force to station half on each car. From his tie-renewal record, the foreman called out or indicated by finger signals the number of ties to be unloaded by each half of his crew as the train moved forward.

Performance Was Satisfactory

In this test it was reported that the special cars proved satisfactory in every way. While the ties are easily pushed past the hinged side stakes, the dragging action of the stakes on the ties prevents them from rolling very far from the ends of the track ties after being dropped from the car. Being hinged at the top the side stakes permit the feeding of a tie at a time out the side of the car, whereas, if the stakes had been hinged at the bottom it was believed that difficulty would be experienced in controlling the discharge of ties from the car. The only difficulty encountered by the workmen was at the time that a pocket was first opened, because the top-hinge arrangement for the stakes makes it necessary to push them out almost to a horizontal position when unloading the first ties from a car. This was overcome by lifting the top two ties from the tier nearest to the stakes and dropping them over the side of the car, after which the remaining ties could easily be pried out one at a time.

A. L. Simpson, timber treatment engineer, stated that no difficulty was experienced in loading this type of car at the tie yard. While each car holds five tramloads which must be placed into four piles, the splitting of tramloads is also required when loading into gondola cars and hence presents no additional problem.

The tie-unloading cars were designed under the general direction of F. H. Simpson, engineer maintenance of way, Lines West of Buffalo. It is anticipated that, after demonstration tests on other territories of the New York Central have further proved their practicability, additional container cars will be converted.

The North Western's station at Chadron, Neb. (foreground) and hotel-office building looked like this before the remodeling work

Ancient Buildings Get Aluminum

At a fraction of the replacement cost, the Chicago & North Western has transformed two 1886-vintage buildings at Chadron, Neb., into neat, trim structures, easy to look at and pleasant to work in. A particularly interesting part of this job was the use of aluminum siding for the exterior

• Two ancient wood-frame structures on the Chicago & North Western at Chadron, Neb.—the passenger station and a hotel-office building—have been given a complete "going over", with the result that a striking transformation has been effected in their appearance and in the accommodations they afford for the working staff. The attitudes of the town citizens towards these buildings have undergone an equally striking transformation. In place of the original lap siding aluminum siding with a bright gray bakelite finish now covers the exterior walls of both buildings from window-sill height to eaves, and on the roofs green-colored slate-surfaced asphalt shingles have replaced the previous mixture of wood shingles and roll-roofing.

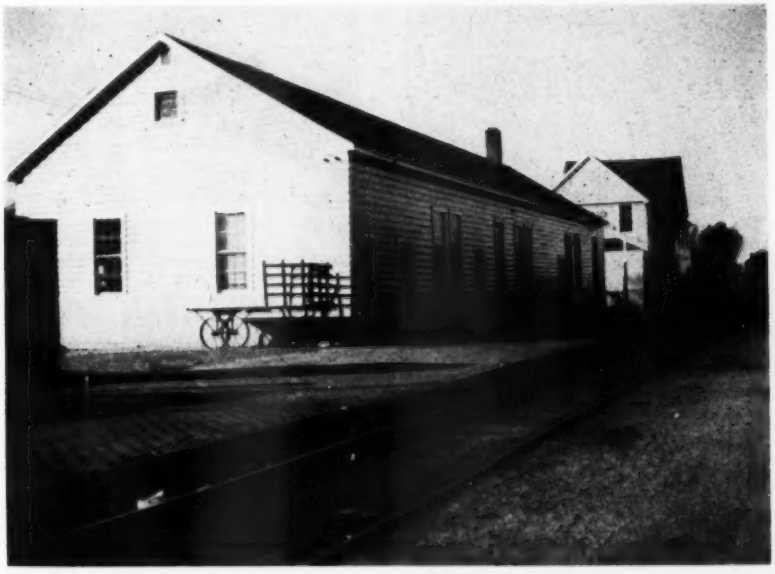
As part of the modernization work 15 coal stoves which formerly supplied heat for the buildings were removed as were almost that many separate chimneys which sprouted up over the roofs, contributing to the fire hazard. Webster Walvector radiators now keep both buildings comfortable in the coldest weather. A modern automatic centralized oil-fired heating plant located in a corner of the office building furnishes the steam. All electric wiring has been replaced and put in conduit, and fluorescent lighting has been installed in both buildings.

The station building, which was constructed in 1886 in the architectural style typical of that day, is a two-story structure 24 ft. by 99 ft. in plan. The second floor is occupied by the offices of the division superintendent and his staff and the train dispatchers. In addition to that already mentioned the remodeling work on this building included the replacement of the original timber-sill and pile-head foundation with a concrete block-foundation, the leveling of the floors, the construction of an additional stairway to the second floor, and the repairing of the windows and doors. Gypsum wallboard with a walnut finish was placed on the interior walls of the superintendent's offices and fiber-board tile on the ceiling. New toilet facilities were installed on the second floor.

The office building, constructed 65 years ago as a hotel, was, before the remodeling work, a two-story, drafty structure about 170 ft. long by 32 ft. wide, part of

The structures, sided with aluminum, now have a neat, trim look even though no change was made in their basic architctural style

n Siding



In this view of the remodeled buildings the hotel-office building is in foreground

which was unused. In the remodeling work the second story of a 100 ft. portion was removed and the roof lowered. The remainder of the building was dismantled. Housed in this building are the offices of the division engineering department and a locker room for trainmen. In these offices, too, gypsum wallboard was placed on the walls and fiber-board tile on the ceilings.

This job gave the North Western its first experience with aluminum siding. The primary reasons for its selection were that it would require no painting and that it would give the buildings additional protection against fire. Also, since it was impractical to improve the appearance of the buildings by changing their basic architectural design, it was thought that the use of aluminum siding would do much toward giving them a neat, trim look.

Before the new siding was applied, the original lap siding was removed and the old sheathing was covered with Truflix insulation. The siding was not applied to the buildings below window sill height because of the damage it might incur if bumped by baggage trucks or other vehicles. These areas were covered with 2-in. by 6-in. boards instead.

The remodeling work described in this article was carried out under the general direction of E. C. Vandenburgh, chief engineer of the North Western, and L. C. Winkelhaus, architectural engineer. In direct charge of the work in the field were G. A. Linn, division engineer, and L. R. Pennington, supervisor of bridges and buildings. All the work was carried out by company forces, except that of applying the aluminum siding, which was done by National Modernizers, Denver, Col. This firm also supplied the siding.

The foam maker and the foam discharge pipe on the small tank at Galesburg. On the roof is the heat-actuated device

System on large Galesburg tank under test. In case of actual fire, of course, foam would be discharged inside the tank

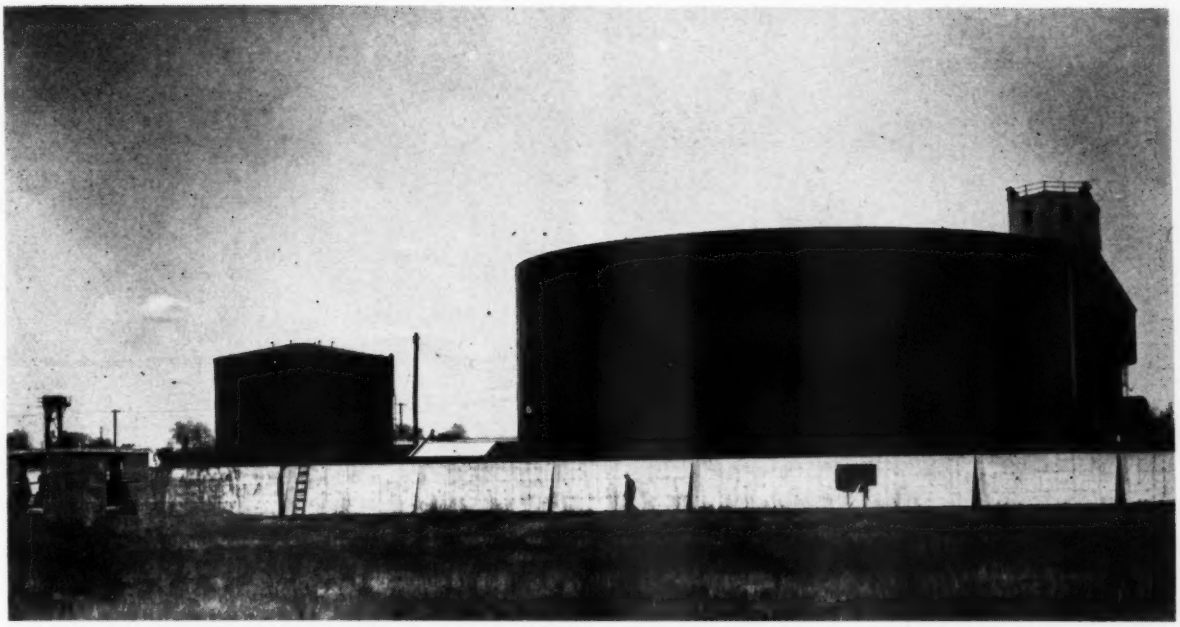
Foam produced during test at Galesburg

Mechanical

Diesel fuel-oil tanks on the Chicago, Burlington & Quincy at Galesburg, Ill., and at Lincoln, Neb., are now protected against fire by fully-automatic systems that require no manual attention

Interior of pumphouse at Galesburg. Foam compound is kept in tank at lower left

• Faced with the need for fast, certain protection against fire at Galesburg, Ill., and at Lincoln, Neb., where large quantities of diesel fuel oil are stored, the Chicago, Burlington & Quincy has placed in service at each location an automatic system which, if a fire breaks out, sounds an alarm, goes into action, and, in a matter of minutes, covers the surface of the oil with a thick blanket of flame-smothering foam. The foam system at Galesburg, which is the fuel-oil storage point for the Burlington's Eastern lines, protects two adjacent tanks, one with a capacity of about 2,500,000 gal., and the other, 200,000 gal. The system at Lincoln—the storage point for the road's Western lines—protects one large tank with a capacity of about 2,400,000 gal.



Fuel oil for the Burlington's Eastern lines is stored at Galesburg in these tanks, which have automatic protection against fire

Firemen Protect Fuel Oil Tanks

Each system is controlled by pneumatic heat detectors, known as heat-actuated devices, which contain both fixed-temperature elements and "rate-of-rise" elements. The former are set to function when the temperature in the tank reaches 212 deg. F. The latter sets off the system when the temperature in a tank rises at a rate greater than any natural rate of temperature rise.

Galesburg System

The system at Galesburg employs three of the heat-actuated devices, two located on the roof of the big tank and the other on the small one. The foam compound supply and the necessary valves and connections at this point are contained in a brick pumphouse located about 100 ft. from the tanks. The foam used in the system is of the mechanical high-expansion type.

When one of the heat-actuated devices is set off by a rapidly-rising temperature, an electric circuit is closed which causes a deluge valve in the pumphouse to start the flow of water. At the same time an electric-driven booster pump is started, which raises the water pressure to 125 p.s.i. If the fire is in the big tank, part of the water discharged from the pump is taken off by a 2-in. pipe. As the water in this pipe flows past an ejector it draws the foam compound from a tank, 6 ft. long by 4 ft. in diameter. The compound, mixed with water, then moves under pressure through the 2-in. pipe which emerges from the pumphouse side by side with a 4-in. pipe which carries the main water supply. These lines lead to the base of the big tank where the 4-in. water line branches into two 3-in. lines which extend to opposite sides of the tank.

Similarly the 2-in. foam line divides into two 1½-in. pipes which parallel the 3-in. water lines to opposite sides of the tank. The foam lines and water lines then rise up on the exterior surface of the tank to foam makers located about 5-ft. below the top of the tank. In each foam maker the two lines merge, air is sucked in, which mixes the water and the foam compound, and the resulting foam is discharged through a curved pipe against the inside of the tank at a rate of about 4000 g.p.m. The force of the discharge thus broken, the foam, from opposite sides of the tank, spreads evenly over the oil surface in a smothering white blanket.

For use at the small tank the foam compound emerges from the pumphouse in a 1½-in. pipe, and the water in a 2½-in. pipe, which run side by side to a single foam maker on this tank.

System at Lincoln

The automatic system at Lincoln is essentially the same as at Galesburg except that, as already mentioned, only one tank is involved. Another difference in the two installations is that, at Lincoln, no booster pump was installed because of the availability of water under sufficient pressure to operate the foam system. This water is furnished by a steam-driven fire pump in the existing power plant. Also, when the fire-protection system is actuated an alarm sounds

Fog Nozzles, which provide either a solid stream of water . . .

. . . or a heavy spray, give additional protection against fire

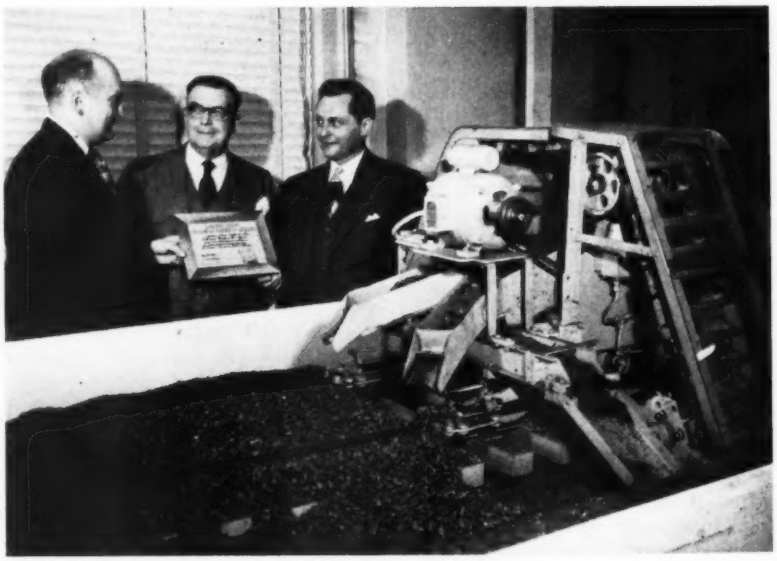
in the power plant to warn the engineer that full pressure is required in the fire line. Further, because of the larger diameter of the tank at Lincoln (119 ft. as compared with 100 ft. at Galesburg) three foam makers were installed on this tank instead of two as on the big tank at Galesburg. Also, the size of the water and foam lines leading to the tank were increased accordingly.

Manual System Also Provided

At both Galesburg and Lincoln the automatic foam system is backed up by manual fire-fighting equipment to provide protection for personnel in the event of fire outside the tanks or in the nearby oil pumphouses, which may make it necessary to manipulate valves at the bases of the tanks to prevent the escape of oil. This protection consists of 1½-in. Fog Nozzles placed at strategic intervals around the bases of the tanks either on or outside the dikes surrounding them. Each Fog Nozzle is attached at the end of a suitable length of 1½-in. fire hose which, when not in use, is folded and housed in a cabinet provided for this purpose. The Fog Nozzles can be adjusted to provide either a solid stream of water or a heavy spray as desired.

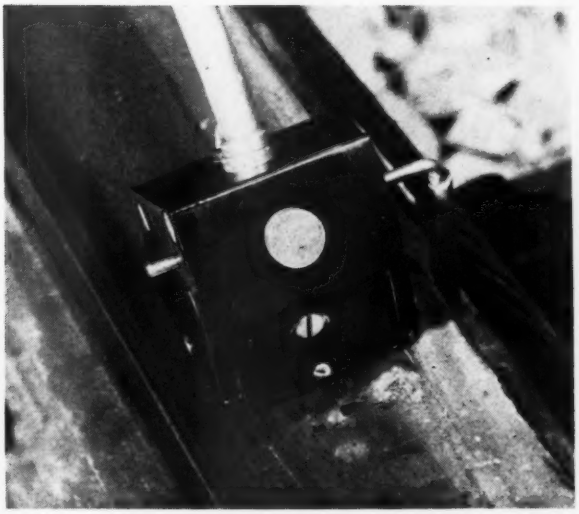
The automatic fire-protection systems described in this article were designed and installed under the supervision of H. R. Clarke, chief engineer of the Burlington Lines, assisted by A. H. Simon, engineer of buildings, and W. D. Gibson, water service engineer. The design work was carried out in collaboration with engineers of H. B. Thoresen & Co., Chicago. The Fog Nozzles, ejectors, deluge valves and other similar equipment were furnished by Fog Nozzle International, Wooster, Ohio, a division of Akron Brass Manufacturing Company. The pumps were supplied by Bowser, Inc., Ft. Wayne, Ind.

Tests of the systems were conducted under simulated fire conditions at Galesburg on May 7, and at Lincoln on May 8. Operation of the automatic units and the quantity and quality of the foam produced were considered satisfactory.



***FOR EXCELLENCE** in the mechanical design of its Power Ballast Cleaner, the Pullman-Standard Car Manufacturing Company, Chicago, has received a Modern Designs award from the Design News Magazine. In the picture Stuart P. Hall (left), editor of the magazine, is handing the award to John A. Curtis (right), manager, Power Ballaster Products Division, as F. H. Philbrick, engineering consultant of the division, looks on.*

The Santa Fe has found the Audigage to be effective for testing switch points as well as rails within the limits of joint bars and other installations where the rail web is obstructed



Double-swivel-mounted, the crystal remains in perfect contact with rail surface regardless of accidental tilting of handle

How Santa Fe Uses Portable Rail Testers

• To increase the scope of its rail-testing activities, the Atchison, Topeka & Santa Fe is utilizing ultra high-frequency sound waves as transmitted by Audigage Flaw Detectors. The first of these devices was placed in service last year, and at present seven of them are in operation. With them the road is inspecting rails within the limits of joint bars, main-line frogs and switch points, and rails within the limits of highway crossings and other installations where the rail web is obstructed. In this work the Audigage has been found to be very reliable and easy to operate. It has been found too that the instrument is easy to maintain and that operators can be quickly trained to use it effectively.

The Audigage Flaw Detector transmits the high-frequency sound waves from a small crystal vibrator into the top of the rail. In testing, the operator, while wearing a set of head phones, moves the crystal longitudinally along the center of the rail head, upon which a small amount of oil has been placed. As long as no defect exists in the rail directly under the crystal, the operator hears in the head phones a high-pitched signal. The presence of a defect is revealed by a distinct change in the pitch of the signal. The instrument, together with self-contained batteries, weighs 11 lb. and is carried on the operator's back.

Adjustable Handle Now in Use

Originally the Audigages on the Santa Fe were each equipped with a hand-held crystal which required the operator to stoop or crouch to place it on the rail head. Now, however, the crystal of each instrument is being mounted in a pivoted support at the lower end of an ajustable handle which permits the operator to stand erect while manipulating the crystal. The safety and comfort of the operator has thus been improved and the speed of operation has been increased.

Rail testing with each instrument is carried out by two engineering-department employees—a transitman and a rodman. Working alternately, one of them operates the Audigage while the other oils the rail, and watches out for trains and motor cars, etc. For transportation each crew is provided with an inspection motor car on which can be carried all the supplies necessary for the rail-testing operations. On the average each two-man crew in one day can test the rail within 800 joints, and in the same period of time, can inspect the frogs and switch points in 20 to 40 turnouts.

With these instruments the defects found in rails and turnout parts have consisted, for the most part, of upper fillet cracks or head-and-web separations, bolt-hole cracks, horizontal and vertical split heads, and vertical split webs. Such defects as base and web separations or lower fillet cracks have been found in smaller numbers. A few transverse fissures have also been found.

The use of the Audigage is being extended to the testing of other track parts, and some experimental work along the line is now being carried out.

Wood Preservers Discuss Problem of Getting Longer Tie Life

W. E. Tiller (Tiller Tie & Lumber Co.), C. F. Grafton (Chapman Chemical Company), P. D. Brentlinger (P.R.R.), and A. Dale Chapman (Chapman Chemical Company)

Addresses at annual meeting bring out results of tie treatment and future prospects on the Santa Fe and the Union Pacific. Research program on the Denver & Rio Grande Western to determine the cause and cure of tie-plate cutting is also described

• At the forty-seventh annual convention of the American Wood-Preserver's Association, held at the Hotel Stevens, Chicago, April 24-26, three addresses were presented dealing primarily with the problem of getting longer life from crossties through preservative treatment and other means. These addresses, all of which were presented at the same session, included one by A. E. Perlman, general manager, Denver & Rio Grande Western, on "Prevention of Mechanical Wear in Crossties"; one by T. A. Blair, chief engineer system, Atchison, Topeka & Santa Fe, on "What's Ahead for Treated Wood in the Railroad Field"; and a third by W. C. Perkins, chief engineer, Union Pacific, who spoke on "History of Union Pacific Timber Treatment."

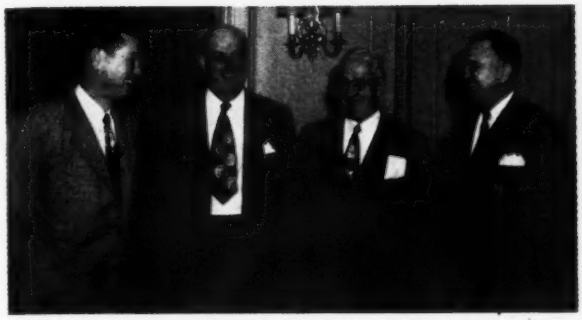
What the D. & R. G. W. Is Doing

Mr. Perlman's address consisted of a resume of the extensive and intensive efforts that have been made on the Rio Grande, starting in 1945, to find methods to reduce or eliminate the abrasion of ties in the tie-plate area. A great deal of the efforts of the railroad in this direction have been based on the theory that a sticky substance placed between the tie plate and the tie would tend to reduce rubbing action between the two surfaces, thereby eliminating abrasions. The first test installation of tie plates glued on with a sticky substance (No. 40 Beckosol) was made in 1946. While the results were not entirely satisfactory it was observed that those ties which experienced little or no penetration frequently showed over the top surface an excess of pitch remaining from the creosote treatment. Based on the idea thus suggested a test installation was made in 1948 in which the ties were painted in the plate areas with Oral tar paint, and in addition some tar-impregnated fibre board pads were put under the plates. Although there was excessive squeeze-out of the pads during warm weather there was some reduction in tie-plate penetration in this test.

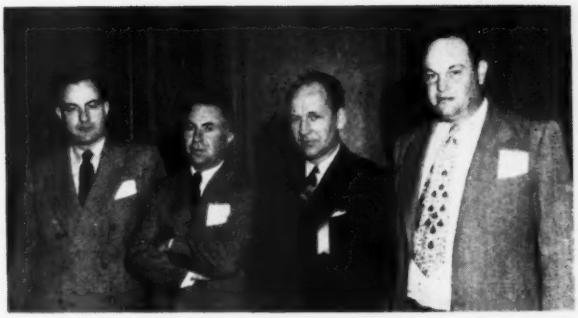
Since no conclusive result had been obtained as a result of these tests the railroad built a machine for making accelerated tests in the laboratory of tie-plate wear of the ties and means of preventing it. "The net results of the studies with this machine," said Mr. Perlman, "were that even the softest of wood, sugar pine, when dry, showed no abrasion, even with 1/16 in. movement of the plate. At the other extreme, oak tie models were rapidly abraded in the presence of a small amount of water and minus 80 mesh dirt." A service test was then made in which various grades of coal tar and asphaltic materials were put under the tie plates to seal out water and abrasive materials. "Unfortunately," continued Mr. Perlman, "temperature changes, especially in the lower ranges through the winter time, broke the seal around the edge of the plate and consequently the purpose was not accomplished."

Since then, according to Mr. Perlman, further tests have been made with various other methods for reducing tie abrasion, including the use of galvanized iron plates to prevent water and grit from feeding down into vacant spike holes, the filling of vacant spike holes with asphalt roof coating materials, and various types of pads placed under the tie plates. A point of interest brought out by Mr. Perlman is that measurements made with a dial gage setup showed no tie abrasion through the winter months. In closing he said, "we naturally do not expect to achieve the millenium of eliminating the condition (tie abrasion) altogether, but results thus far obtained having been encouraging."

In his address Mr. Blair first gave a thumb nail review of the history of timber treatment on the Santa Fe, in which he pointed out that only creosote-petroleum solutions have been used since 1923, and that at the present time the standard teatment for crossties consists of a 10-lb. retention of 30/70 creosote-petroleum solution. Later in his address, Mr. Blair discussed the problem of mechanical wear of crossties. Examination of a total of 80,362 ties which had been removed from track during the first ten months of 1950 showed that only 3.8 per cent were taken out because of decay, while 20.2 per cent were removed because of plate cutting, 31.5 per cent due to splitting and 29.2 due to shattering. The various measures that are being tried out on the Santa Fe to prevent plate cutting, according to Mr. Blair, include tie pads, coatings of various materials between the tie plates and top surfaces of the ties, coatings of the whole tie, the incising of gum and oak ties, and various types of spikes and rail fastenings.



President F. W. Gottschalk (left) enjoys a moment with J. S. Giddings (AT.&S.F.), A. J. Loom (N.P.) and Clarence Burt (I.C.)



D. B. Mabry, Meyer Levy and I. C. Miller (all representing the T. J. Moss Tie Company), and G. B. Campbell, Jr. (Tiller Tie & Lumber Company)

After quoting figures to show the average service life now being obtained from ties on the Santa Fe, Mr. Blair said that "consideration of these figures leads me to believe that we can expect an average service life of 30 years or more from our treated ties in the future, particularly when the effects of modern tie plates and roadway maintenance practices have been felt. A solution of the problem of protection from mechanical wear also will result in an increased life."

He said that the treatment of bridge timber piles has been conconsiderably reduced in recent years on his road due to the fact that "we are getting more service life from treated timber bridges than we formerly anticipated. Some 20 years ago we estimated a service life of 30 years from our treated timber bridges and based our cost estimates on that figure. We later revised the estimate to 40 years. As a result of inspections within the past few years we now consider that the service life of our timber treated bridges will be more than 40 years."

Pointing out that his subject called for a prediction of what is ahead for treated wood in the railroad field, Mr. Blair made a projection of the tie-renewal figures for all Class 1 roads for the five-year period ending with 1949, arriving at the conclusion that "a total of 37,028,591 ties will be needed annually for renewal by Class 1 railroads." As for the requirements for treated wood products other than ties by the railroads in the future he saw "no reason for a change in these requirements in the immediate future at least." Concluding, he said that, "although treated wood will probably not be used in replacement of some structures, new uses for treated wood will probably be found, particularly since wood teated with fire-retardent chemicals has come into the picture."

Trends in Treatment on U. P.

In reviewing the history of timber treatment on the Union Pacific Mr. Perkins, among other things, noted that the first treating plant west of the Missouri river was built by the Union Pacific at Omaha, Neb., in 1865. After tracing the construction of other treating plants on the U. P., Mr. Perkins went into a discussion of how preservative treatment has extended the life of crossties on his road. Experience with Burnettized crossties, which were installed from 1904 until 1931, indicated that they had an average service life of approximately 15 years. The road then began the use of creosote-petroleum solutions, now used in a 50/50 proportion. While in 1945 it was estimated that the life of 50/50 creosote-petroleum treated crossties would be 25 years, he said, "it now appears that this estimate was ultra conservative, and that we can depend on a service life of 30 years with a maximum of 50 years." During the past ten years, 1941-1950 inclusive, after the major portion of the Burnettized crossties had been replaced by creosote-petroleum treated crossties, causing the full effect of the better treatment to be realized. Mr. Perkins said that "average renewals have dropped to 113 per mile and we expect a still further drop to approximately 100 per mile for all tracks maintained."

With a total of 670 members and guests present, attendance at the convention reached an all-time high. The meeting was planned and directed under the general supervision of Fred W. Gottschalk, president of the association, and

V. C. Otley Barrett Div., Allied Chemical & Dye Corp.), and W. E. Gadd (Taylor-Colquitt Co.)

W. C. Perkins (U.P.) presenting his address

technical director, American Lumber & Treating Co.

In the election of officers W. R. Yeager, inspection engineer, Western Electric Company, Inc., New York, was advanced from first vice-president to president; R. H. Bescher, manager of technical department, Koppers Company, Inc., Orrville, Ohio, was advanced from second vice-president to first vice-president; and P. D. Brentlinger, forester, Pennsylvania, was elected second vice-president. W. A. Penrose was elected secretary-treasurer to succed H. L. Dawson, who has retired. Newly-elected members of the Executive committee are A. S. Daniels, Texas & New Orleans (Southern Pacific Lines in Texas and Louisiana), and N. E. Kittell, Joslyn Manufacturing & Supply Co., Franklyn Park, Ill.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems

Where To Put Heart Side of Ties

What, if any, benefit is derived by following the almost universal rule that the heart side of ties must be turned down when they are put in track? Explain.

Put Exposed Heartwood Down

By C. D. TURLEY
Engineer Ties and Treatment, Illinois Central, Chicago

In the early days of railroading the track structure consisted of narrow-base rails of light section, on unplated, untreated wood crossties, necessary track connections and spikes. The denser and more durable species of woods, usually white oak in the North and East and heart pine in the South and West, were used for crossties because they provided a more satisfactory support for the rail base and gave more holding power to the track spikes. Logs large enough to produce two, four or even more ties were split through the pith and heartwood and then hewed by hand into crossties. Quite frequently one face of a tie or a portion of it would contain the softer sapwood and for the reasons explained above it became common practice for trackmen to install such ties in track with the harder and tougher heart side up.

In more recent years, and with an ever diminishing timber supply, it became necessary to conserve timber and to improve and lengthen its service life. More than 50 years ago the treatment of wood with creosote and other preservatives to prevent decay was started. That practice has increased until today it has become universal. During this time the track structure has also been greatly improved and strengthened and larger tie plates have been applied to protect crossties from mechanical wear.

Today, the large tree from which several crossties per cut would formerly have been split is sawed into lumber, whereas crossties are seldom cut from logs large enough to produce more than one tie per cut. As a result, only an occasional tie has a heart face throughout its length. However, where heartwood is exposed, the tie should be placed in track with the heart side down. Heartwood checks and splits badly when exposed to the air and hot sun. Hence, since it is next to impossible to penetrate it with creosote or other preservatives, a tie that is installed with the heart down where it will be protected from the elements by the ballast will last much longer than with the heart up. Occasionally you will observe a tie in track with the heart face up which has given long service, but this is the exception rather than the rule. These particular ties contain extraordinary amounts of resins and other natural wood-preserving substances.

Ties Split With Heart Up

By L. A. RAPE
Section Foreman, Baltimore & Ohio Harmony, Pa.

Ties with the heart up tend to split more quickly from the action of the weather and will also split more readily from spiking. For illustrative purposes let us assume that the tie is sawed so that the heart is exposed on one side. This leaves the growth rings as half rings. The part of the ring which grew during the warm and wet part of the year is softer and more porous than the part of the ring

---

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the August Issue

1. When clearing for trains, should rail-laying equipment be set off alongside the track or be run to the nearest siding to clear as a unit? What factors are involved? Explain.

2. What factors establish the minimum engine-generator capacity for operating electric tools used in building construction and maintenance? How is the capacity determined from these factors? Explain.

3. Where ditches having heavy grades must handle a large volume of water, what steps can be taken to prevent scouring?

4. What effect does the time of mixing have on air-entrained concrete? How does the effect differ, if at all, when using, on the one hand, air-entraining cement or, on the other, normal cement with an air-entraining agent added at the mixer?

5. Under what conditions should rails be inspected for defects within the limits of the joint bars? How often should such inspections be made?

6. If waste oil should get into sewage-disposal facilities how does it affect Imhoff tanks? How often should such tanks be cleaned? Explain.

that developed during the winter. If the heart is up this means also that the ends of the half rings or semi-circles are up forming in effect a bowl or trough which collects and holds, to a certain extent, any water falling on the surface of the ties. This water of course rots the wood or, if frozen, expands and breaks up the wood fibres causing the ties to split.

If the heart is turned down it is like inverting a bowl or trough and each ring acts like a roof over each ring below it and the soft or porous part of the ring has a chance to drain. Of course the tie will still absorb some moisture from the ballast but will not collect or hold water to the same extent as with the heart up.

When To Paint Galvanized Steel

Should galvanized iron roofing and siding on buildings be treated and painted as soon as erected or should this material be allowed to weather a period of time before being painted? Explain.

A Matter of Preference

By JOHN C. MOORE
Director, Scientific Section, National Paint, Varnish and Lacquer Association, Inc., Washington, D. C.

Iron for roofing or siding on buildings is galvanized for the purpose of protecting it from rusting. Galvanizing also offers some desirable decoration. Therefore, whether to paint new galvanized iron shortly after erection or to wait is largely a matter of preference. If the purchaser of the galvanized iron desires a different color, some type of chemical treatment to etch the galvanizing slightly is necessary if the paint is to adhere properly. There are several such chemicals designed to perform this function. There has been much research conducted on the best type of primer to apply to new galvanized iron. One of the primers recommended for this purpose is formulated to use zinc dust as one of the pigments. Over such a primer the top coat of the color desired is applied.

If it is desired not to paint when first erected, and thus retain the original color of the galvanized iron, extended exposure to weather and to man-made conditions will age the galvanizing, and rust will likely appear. The repainting of such a surface requires that it first be thoroughly cleaned to remove all rust, grease or dirt. Immediately after the cleaning a rust-inhibitive primer must be applied. As all the galvanizing is usually not removed when rust first appears, it is suggested that the second coat may be the special galvanized iron primer which includes zinc dust. The top coat could then be the exterior or interior decorative paint of the color desired. No special brand-name paints are recommended, because those desiring such paints for application to galvanized iron already have their sources of supply well-established, and should accept the recommendations of their paint supplier.

Pretreatments Are Effective

By GEORGE DIEHLMAN
Protective Coating Paints Division, National Lead Company, Brooklyn, N. Y.

If new galvanized iron is allowed to weather outdoors for approximately six months, sufficient reaction occurs between the environment and the zinc (galvanized metal) to provide a surface to which paint coatings will adhere.

The application of paint, regardless of composition, to new galvanized iron surfaces is uncertain in its results. The type of failure commonly experienced from such a practice is a loss of adhesion between the paint film and the surface in the form of severe peeling. Certain weather conditions such as heavy rainfall followed by low temperatures seem to be particularly disastrous. A study has been made of the reaction products between galvanized surfaces and the paint film. This has lead to the conclusion that zinc formate is one of the principal products of reaction. The formation of such reaction products is considered responsible for loss of adhesion and consequent peeling of the applied organic coating.

Where new, unweathered, galvanized metal surfaces must be painted for decorative or other important reasons, the use of a chemical pretreatment has been found to improve the adhesion of the subsequently applied paints. The hot-dip and cold-wash phosphate pretreatments—applied during manufacture—have been found to be most effective. These chemical pretreatments are generally based on inclusions of metallic phosphates, free phosphoric acid, and alcohol. Proprietary chemical pretreating solutions of the phosphate-forming type are widely available. Their proper application on new galvanized metal surfaces freed from dirt and greasy material is valuable insurance against the loss of adhesion of any subsequently applied paint coating.

Should Always Be Treated

By E. T. CROSS
Vice President, Armco Drainage & Metal Products, Inc., Middletown, Ohio

Galvanized iron roofing and siding may be painted as soon as erected but best results are obtained by painting after treatment —either by manufacturer or user. On untreated surfaces, the zinc reacts with the oils in the paint and premature flaking usually occurs. A partial solution to this problem is to use a soft linseed oil primer followed by soft finish coats. Ordinary house paint may be satisfactory but a hard finish paint will cause flaking. Generally speaking, this is not a satisfactory procedure for industrial buildings.

Allowing siding and roofing to weather or etching the zinc surface with copper sulphate or vinegar will provide some tooth for the paint film but will not halt the drying out of the paint film by the zinc. What is more, either weathering or etching removes substantial amounts of zinc and may seriously affect the life of the building. Galvanized steel treated by either of these methods should be covered with a zinc dust, zinc oxide, linseed oil primer and a suitable exterior paint.

For maximum durability galvanized surfaces should be painted immediately. And satisfactory painting requires pretreatment of

the galvanized surface. The most effective treatment involves putting on the zinc a phosphate film, which not only has a toothed surface but which also effectively insulates the paint film from the drying reaction of zinc.

This can be done with Lithoform, manufactured by the American Chemical Paint Company, or Bonderite solutions, produced by the Parker Rust Proof Company. The manufacturer's directions should be followed explicitly. If possible the surfaces should be given a final rinse with a chromic-acid solution containing one ounce of flake chromic acid in 10 gal. of water. Buildings can then be painted with any good paint.

The simplest and best solution to the problem is to use roofing and siding that are made of zinc-coated steel that is pretreated. One such pretreatment involves the application of phosphate to a full-weight zinc coating at the mill. Neither the zinc nor phosphate coating are harmed by forming operations inasmuch as they stretch with the base metal. Full corrosion protection is obtained from the unbroken zinc coating and it can be painted immediately after erection of the material.

Roofing and siding made from ordinary galvanized steel can also be given satisfactory pretreatments by the manufacturer. It is equally important that galvanized steel be properly handled prior to actual use. Much of the useful service life of galvanized roofing and siding is lost due to improper storage during building erection.

Galvanized coatings which would last many years in normal service may be severely damaged by getting wet when the sheets are in piles. Under this condition drying out is slow, and prolonged contact with water, together with the lack of aeration, cause rapid corrosion of the zinc. Further damage to the zinc coating occurs when corroded sheets are cleaned prior to painting. If kept dry, galvanized sheets can be stored for prolonged periods without damage to the surface.

How and Where To Place Bumping Posts

What rules or specifications govern the provision of bumping posts on industry tracks? Is there a hard and fast rule governing the distance between the striking plate of the post and buildings or other structures beyond the end of the track? Explain.

No Definite Rules Possible

By J. H. Ferguson
Office Engineer, Union Railroad, East Pittsburgh, Pa.

Serious thought and study should be given to the installation of any bumping posts on industry tracks because it is difficult to combine the various requirements into one functional use. Bumpers are devices designed to stop cars or locomotives in motion at an established limiting point, or within a definite limiting distance. Ordinarily, there are two classes to consider—rigid and semi-rigid. Where the safety of many people is prevalent, such as in passenger stations and freight terminals, a structure sufficiently rigid should be installed to destroy the car if necessary, rather than incur greater damage by its further progress. This type, comprising a mass of concrete and steel, requires much space and is costly, but is good insurance where such extra precautions are warranted.

Where there is a minimum of track room, which is generally the case, commercial bumping posts are adaptable. These are designed to receive the impacts of the drawhead and furnish protection against the shocks of fairly severe service. Since the tension members of modern commercial bumping posts are an extension of the track rails, or special rails bolted to the track rails, it is very necessary that the track be of good construction, and adequately maintained.

Where commercial bumpers are installed in the open, at the ends of yard or stub tracks, it has been our practice to keep the distance between the striking plate of the post and buildings or other structure beyond the end of the track at least 25 ft.

Tracks inside of building should be arranged, if possible, so that the end of the track is not opposite a column or any supporting member. In our own diesel-repair shop, where space was at a premium, a buffer was designed at the end of the inspection pits, using structural steel members and two draft gear assemblies to absorb the shock. The complete assembly is bolted to a concrete foundation. Beyond the end of the tracks and 5 ft. 3 in. above the top of rail is a truck area and walkway. For further safety precautions, the structure immediately behind the buffer installation was constructed of timber, using boards with beveled sides so that they would slide over each other if the locomotive was not stopped at the bumper. In this case, the distance between the striking face and the permanent concrete is 11 ft.

Many elements enter into the installation of bumping posts, such as location, use, safety, vision, space, as well as the possibility of human and mechanical failures. Ordinarily, no hard and fast rule can be specified for governing the distance between the striking plates of posts and buildings or other structures beyond the ends of the tracks. It is far better to study each individual case and install the type which is the most suitable for that particular situation.

Well Placed Bumpers Needed

By H. C. Koch
Roadmaster, Belt Railway Company of Chicago, Chicago

Cars being spotted on industrial tracks, especially in crowded metropolitan areas, occasionally strike bumping posts or car stops too hard and thereby cause considerable damage to structures, machinery, and manufactured products that are located beyond the ends of tracks.

Such accidents occur regardless of rules and regulations established to prevent them. The operating department of a carrier has an endless manpower problem, and night switching in many instances is performed by crews with the least experience. Some of the reasons for striking a bumping post or car stop too hard are: (1) cars breaking loose because of coupling failures; (2) poor visibility at night;

(3) inability to pass signals when tracks have sharp curvature or when areas adjacent to tracks are obstructed; (4) handling too many cars in one cut; (5) grease or similar substance on top of rail causing wheels to slip; and (6) setting cars on the wrong track.

The increasing number of industry tracks that are depressed along platforms, both inside and outside of manufacturing plants, has made the problem of installing bumping posts an important matter. Industrial engineers and other interested parties should be educated about the dangers of locating a bumping post at the end of tracks too close to an important structure or machine. The original installation may have been good, but, too often, alterations are made that disregard the potential danger of an accident. Walls, machines, electric transformers and other important equipment are all too frequently permanently located or stored immediately adjacent to the end of a track. Alterations are frequently made without consulting the carrier and knowledge of the unsafe condition is usually discovered after an accident involving considerable damage. Costly damage claims against the carrier and undetermined production losses sustained by the industry should certainly be sufficient argument for properly locating an adequate bumping post or car stopper.

To cope with these conditions in a realistic manner, to save carriers the cost of paying large damage claims, and to eliminate costly production delays to industries, it would be worthwhile to pass along to all concerned the following or similar suggestions: (1) When buildings or important machines and equipment are located beyond the end of a track, an adequate bumping post should be installed with at least 15 ft. between the striking plate and the structure beyond it. (2) Areas adjacent to tracks should be kept clear so switching crews can pass signals with the least interference even though tracks have sharp curvature and are located inside of buildings. (3) A bumping post should not be installed with any part of the post in the wall of a building nor with a platform constructed over the top of a post.

When a bumping post is located 15 ft. or more from a structure or important piece of equipment, it is reasonably certain that, even though the post is hit too hard, the car at the post will stop before it hits anything important beyond the post. This rule also applies to retaining walls and platforms located beyond posts at the ends of depressed tracks because cars hitting posts too hard have a tendency to pass over the tops of the posts. A car that raises off its truck that is nearest the post can easily skid on a platform that is behind the post. It may cost several hundred dollars to repair the track and post, but several thousand dollars can be saved if cars do not hit the building wall, machines or something else of importance beyond the end of the track.

For various reasons it may not be feasible to allow sufficient room beyond the bumping post. In such instances, a carrier would not be unreasonable if it should notify the industry that it will not assume damages, in case of accident, in certain areas beyond the bumping post. If consulted, any carrier can recommend the installation of an adequate post and, possibly, advise about other safety measures that would decrease the accident potential.

How To Protect Heads of Concrete Piles

What is the best method of protecting the heads of precast reinforced-concrete piles to prevent injury during driving? Explain.

Use Wood Cushion Blocks

By W. G. CUMMINGS
Raymond Concrete Pile Company, New York

The first and most important item to consider when designing precast piles is to provide for sufficient reinforcing steel. There are three main functions of reinforcing steel:

(1) To help carry the load imposed by the completed structure, for which the pile is considered as a column laterally supported full length if completely embedded in soil, or partially supported with an unbraced length from the ground line, or mud line in a stream, to the point of cut-off. The unbraced length is then designed with the usual column formulas, taking into account any horizontal forces inherent in the structure.

(2) To protect the pile while handling from the casting yard until it has been picked up and placed in the leads. The piles are handled in a horizontal position and must be designed to withstand bending stresses. This is usually done by incorporating additional steel at the pick-up points to take care of the bending stresses at these points.

(3) To provide enough area of steel, bonded to concrete, to keep the pile from shattering during driving.

There are several typical designs of precast piles. Although each type is of a different shape, the spiral reinforcing, which governs the design as far as resisting driving stresses is concerned, is the same. This does not mean, however, that all precast piles have the same reinforcing. We merely point out that the shape of the pile is not the governing factor in determining the spiral pitch. The mass of the pile, the load to be carried, the driving equipment to be used, and the subsurface soil conditions at the job site must all be determined before proceeding with the design. There are too many varying factors involved to make any definite table or set of graphs enabling a designer to just pick off the steel requirements.

It is important to have a good design from the beginning of the job. If, after casting a yard full of piles, you find there is not enough steel in the head of the piles to prevent shattering, even with the usual driving precautions, you will wind up with a lot of rejected piles. This can be pretty costly.

In the field it is standard practice to protect the pile head by using wood cushion blocks. A steel follower is made to fit over the top of the pile with the sides of the follower extending a short distance down the sides of the pile. A wood cushion 4 in. or 5 in. thick is placed between the top of the concrete pile and the bottom of the follower. Another wood block, about 6 in. thick, is placed between the top of the follower and the striking part of the hammer. The cushion blocks do not stand up long under the pounding of the

hammer and new ones have to be put in frequently. One block usually lasts during the driving of one to four or five piles, depending on the length of pile and the density of the soils through which it is driven. Occasionally, laminated cushion blocks of plywood and/or celotex are used when it is necessary to soften the blow of the hammer on the head of the pile.

When the vertical reinforcing does not extend up through the top of the pile it is a simple matter to place the cushion blocks between the top of the pile and the follower. However, when vertical rods do protrude from the top of the pile it is necessary to bore holes in the cushion block to match the spacing of the reinforcing. It is very often impractical to cover completely the protruding reinforcing steel with cushion blocks. It is then necessary to drill holes in the pile follower to match the steel spacing. The follower therefore must be long enough to encase the reinforcing without danger of the hammer ram damaging the rods, as the cushion blocks are compressed during the driving operation.

One item that has not been mentioned but which is all-important is to use good concrete, not less than six to seven bags of cement per cubic yard, preferably the higher, and use care in forming and pouring the piles. With proper design and proper handling of the piles in the field, the protection mentioned above should insure the driving of precast piles without damaging the heads.

Suit Method to Condition

By Assistant Engineer

We have used very few concrete piles in recent years. We did, however, drive one bridge in 1944 using two dozen 24-in. octagonal piles, 65 ft. long, weighing 16 tons each. We started the work by boring 22-in. holes in the hard clay, but the clay was so hard that the piles would not drop into the holes. Hence it was necessary to excavate to a sufficient depth to get a hammer over the piles.

The piles were then driven with a Super-Vulcan 80-C hammer, having a total weight of 17,385 lb., an 8000-lb. ram, and a stroke of 16½ in. This hammer delivered 111 blows per minute, under steam pressure of 120 lb.

Because a different hammer was used than was originally contemplated, it was necessary to shape the top of the piles to fit the cast steel driving head. No cushion was used between the pile and the driving head. All piles were driven to refusal at depths varying from 27 ft. to 59 ft. below the ground level. The tops of the piles showed no chipping, crushing or damage whatsoever. The lightness of the hammer in comparison to the weight of the pile may have had some beneficial effect.

What Causes Muddy Track?

What makes track get muddy? What is the origin of the material that causes the mud? What methods are most effective in preventing the development of this condition? Explain.

Mud Has One of Two Origins

By L. A. Rape

Section Foreman, Baltimore & Ohio, Harmony, Pa.

There are several causes for muddy track. They can be grouped in two origins—surface and subsurface. Muddy track originating on the surface is caused by foreign material carried into the ballast by leakage from cars, by dirt blown by winds, by flood waters, by slides or, inexcusably, by work equipment used without regard for how much dirt is left on the ballast. Engine sand is also the major factor at some locations.

Muddy track originating in the subsurface is the most common and is almost always caused by improper construction of the subgrade. Insufficient drainage or too much porous fill encased in clay are the major offenders.

The most common muddy track appears to pump mud and in some cases does actually pump the mud from the subgrade. This is caused by lack of adequate drainage during construction. Quite often there is a layer of shale rock over a vein of clay and plenty of water present. A crack is usually present in the shale rock. The weight of a train depresses the rock into the clay, and when the load is off the rock springs back up and allows water to enter between it and the clay. This thins the clay to a liquid state. The next load on the rock depresses it, forcing the liquified clay up through the crack in the rock, through the ballast and to the surface.

In many cases this rock is artificial, having at one time been granulated slag dumped as ballast on a wet place. As long as train and engine loads were light and infrequent it served its purpose. In the meantime, however, it "set" like concrete. Then under heavier loads it broke into slabs of varying sizes and started pumping mud and sometimes developed water pockets. When such water pockets get big enough they no longer cause muddy track but are much softer than the ordinary muddy track. They can be cured by pumping them full of grout, thereby forcing the water out.

In many cases muddy track is due to the ballast being foul clear down to the subgrade. In that condition it acts like a squeezed sponge with no place for the water to go to except to the surface and in the process it carries mud with it. This mud encases the ties and then the tie under traffic acts as a piston and pulls more water up every time the tie comes up. The cure for this condition is to get enough good clean ballast under the ties so that after some of the ballast has settled into the old fouled ballast there is still a foot or more of clean ballast under the ties. Then this clean ballast can breathe air instead of sucking water up from the subgrade.

Caused by Dirt and Water

By George S. Crites

Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Fine earthy particles mixed with water make mud. On tracks, the particles largely come from dust in the air, engine and car drop-

pings, ground-up ballast, washed-in mud and, in some locations, materials pumped up from the subsoil. Water comes from rains and snows, floods, side washes, droppings from steam engines and passenger cars, and in some places it may be squeezed up out of the roadbed.

An oiled roadbed helps in having dust blow off tracks. Expanding use of diesel and electric motive power is reducing engine droppings. Hard, non-eroding ballast keeps ground-up ballast particles to a minimum. Proper drainage protects tracks from wash-ins. A good sub-ballast helps by keeping mud and water from pumping up from the subsoil. However, mud-carrying floods that overflow tracks will cover and saturate them to such an extent that the mud coatings have to be skinned off the surface and the ballast cleaned.

Rain and snow water may wash mud down and away from the track areas if proper drainage is provided. Impermeably oiled roadbeds cause much water and mud to wash off and not into tracks. Good ditches avoid wash-ins. Where front-end cinders have accumulated for years, sodding of cut slopes and right-of-ways holds down dust. Where sod will not grow, oiled slopes and right-of-ways may keep dust from blowing onto tracks. A good sub-ballast should keep mud and water from coming up from underneath tracks.

How To Stop Pipe-Line Corrosion

Under what conditions should underground pipe lines be protected from corrosion? What methods are available for this purpose? Explain.

Protect All Deep Pipes

By Al Bohne
President, The Tapecoat Company, Evanston, Ill.

On buried steel pipe lines, decay takes the form of corrosion which is caused principally by action of soil chemicals that combine with the pipe metal in the presence of moisture. The action is electro-chemical and, by means of electrical instruments, surveys permit limited prediction of the degree of soil action to be expected.

The probable corrosion on unprotected new lines can be only approximated, either from soil surveys made along the proposed route or by studying the experience on existing lines in the vicinity. Under these conditions, therefore, it is essential that all underground pipe lines be protected against these destructive forces to avoid possible failure of the line.

Experience has shown that corrosion on buried pipe lines can be prevented or retarded by pipe coatings having these important properties: (1) Low moisture absorption; (2) retention of form under soil pressure; (3) inertness to soil chemicals; (4) insulation from electrical currents; (5) insolubility in hydrocarbons; and (6) ease of application. A coal tar coating applied hot has proved itself over many years to have all the qualities desired for lasting protection to the pipe. Of the various types of coal tar coatings, hot-poured enamel is being used extensively on gas and oil lines, and is applied in the field by coating applicators or by traveling-type coating machines.

Where pipe is coated at the mill, it is essential that the joints get equivalent protection in the field with a coal-tar coating that can be easily and quickly applied, thus protecting the "links" in the pipe line.

Several Methods Available

By H. E. Graham
Assistant Superintendent Water Service, Illinois Central, Chicago

Costly replacements of underground pipes are due mostly to the effects of corrosion. Corrosion not only damages the pipe, but causes loss of the fluid through leaks. This loss may amount to a considerable sum of money. Out-of-service time may also be a very important intangible cost which could justify the expense to protect the pipe from corrosion.

When pipe lines are placed under several feet of cover or put in inaccessible places, the corrosive condition of the soil must be determined, and if found necessary, protective coatings applied at that time. Differences in the physical and chemical properties of the various soils cause a wide variation in the rate of corrosion. Accelerated corrosion should be expected in cinder fills. The amount of ground water has a direct bearing on the corrosion rate, and anything that can be done to improve drainage, such as bedding and backfilling with sand, gravel, or crushed limestone, will reduce the action on the pipe. Clay will afford some protection, but it cannot be relied upon where the drainage condition is poor.

Cast iron, wrought iron and steel are the metals most generally used for underground piping systems and are subject to the major portion of the corrosion that takes place. Certain types of installations can be protected from corrosion by various coating materials supplemented where necessary by cathodic protection. The corrosion of small-diameter-pipe systems is usually controlled more economically by using pipe made of metals and alloys, such as copper, brass and lead, which are inherently resistant to corrosion. Zinc applied to iron and steel pipes will provide protection in the less corrosive soils. However, in cinder fills, a long life should not be expected.

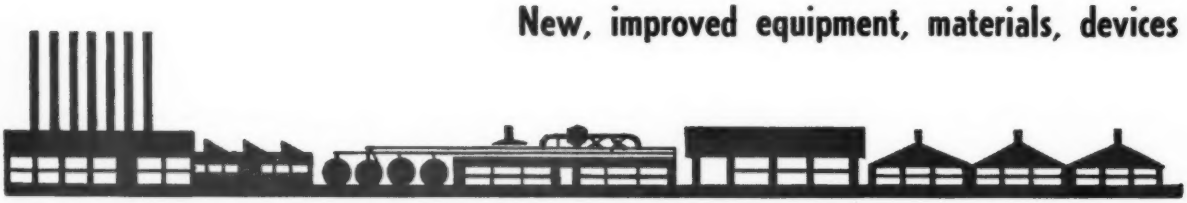
When non-metallic protective coatings are applied, they should provide waterproofing, shielding from soil stress, and insulation from electric current. Coatings which meet these requirements include the asphaltic or bituminous type, applied hot, and the petroleum-base coatings, which are usually protected with a spirally-applied reinforced fabric wrapper in direct contact with the undercoating.

Cathodic protection can be used to reduce corrosion of existing uncoated pipe systems and in combination with a protective coating on a new pipe line. When used in combination with a protective coating, the current density requirements are materially reduced.

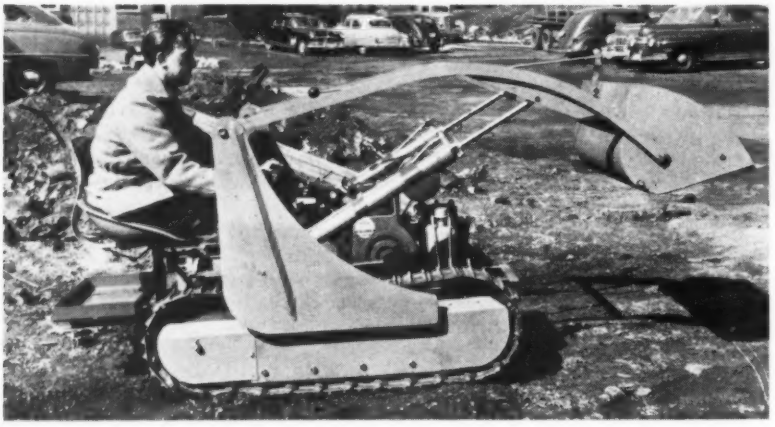
Not all losses due to corrosion can be economically prevented. Therefore the required service life of the pipe, the life of unprotected pipe as compared with the increased life due to the protection, the cost of protection, and the cost of renewing the pipe line, are all factors that must be studied carefully.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices



(For additional information on any of the products described in these columns, use postcards, page 523.)



SMALL TRACTOR-SHOVEL

THE Mead Specialties Company, Chicago, has announced a midget materials-handling outfit consisting of a crawler tractor, called the Model M-6, equipped with a shovel attachment, known as the High Lift. Small in size and highly-maneuverable, the machine is designed for loading skip mixers and small trucks, cleaning tracks and platforms, ditching and removing weeds, and leveling and backfilling where larger machines cannot work. The tractor has a two-speed transmission, final drive running in oil, a fully-shielded bogey carriage, and spring-loaded front idler wheels. In addition to the High Lift, a number of other attachments are available, including rubber treads, a knife mower, a rotary broom and a wagon.

NEW TREATMENT FOR DIESEL COOLING WATER

CHROMATE corrosion inhibitors for the cooling systems of diesel locomotives have been approved by all major diesel builders and, generally speaking, are producing satisfactory results. But chromate is becoming short in supply as a result of the increasing demand for chrome chemicals in defense production, and in the event of war, may become totally unavailable, because the ores from which it is made are practically all imported from Africa, Turkey and a few other sources.

Over a year ago the Dearborn Chemical Company, Chicago, initiated a research program aimed at the development of alternate corrosion inhibitors which could be used in diesel cooling systems instead of chromate if the shortage of that chemical persisted or if it became unavailable. This work culminated last fall in the development of a non-chromate inhibitor which has been designated as Dearborn Cooling Water Treatment, Formula 524A. The new material is currently under field test on the Nashville, Chattanooga & St. Louis at Nashville, Tenn., and at other locations.

At Nashville samples of cooling water have been collected daily from test locomotives for field determinations of inhibitor concentration, and at weekly intervals samples have been sent to the Dearborn laboratories for complete chemical analysis. The company reports that these analyses have shown consistent maintenance of a protective concentration of the inhibitor in the cooling water, and a low concentration of metal in the water, which means that corrosion was being controlled. An inspection of the cooling system of a test locomotive after 120 days of operation revealed no evidence of corrosion.

The concentration of Formula 524A as recommended by Dearborn is 0.75 oz. per gal. of water. In the field the concentration of the chemical in water may be determined by use of a conductivity-type instrument such as the Dearborn Concentrometer. The concentration may also be determined by the more recently developed colorimetric test.

The manufacturer reports that the new inhibitor formulation is not compatible with chromate materials. Before starting to use Formula 524A, cooling systems formerly containing chromate-type treatments should be drained and thoroughly flushed.

COVER LENS FOR SAFETY GOGGLES

A NEW plastic cover lens for protecting more costly filter lenses from scratches and from hot-metal spatter has been announced by the American Optical Company, Safety Products Sales division, Southbridge, Mass. The company says that the new lens is more durable than those made of ordinary glass and plastics and will remain pit-free longer. Also, it has shock-absorbing qualities which prevent cracking upon impact.

(Continued on page 560)

IS WEED KILLER A LUXURY TO BE REFUSED WHEN EARNINGS ARE OFF?

FREQUENTLY a maintenance engineer with plans completed for an early spring weed control program, finds his plans blocked by management with this comment—

"Existing conditions call for economy — no weed killer this year."

One well informed engineer sent this comment —"I have kept records of the cost of chemical weed killer treatment since we first started using it twelve years ago. I have in fact satisfied myself that when we order weed killing service, it actually costs us nothing."

"I base this conclusion on the following observations:"

"Section men cannot work a track properly when weeds block their progress. The time they spend before getting to work that may be done by manual effort alone, runs into losses that would more than have paid for a heavy chemical treatment."

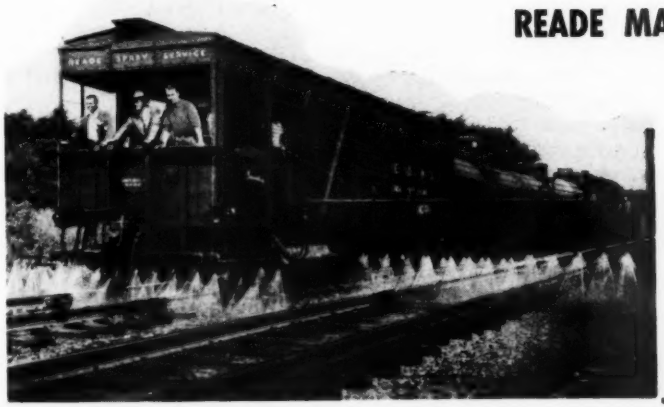
"Standards of maintenance drop all along the line when weeds are permitted to make a track unsightly, the attitude of the men being why worry about track standards when weeds in any case spoil the appearance of the roadbed."

This answer to the big boss put the order in reverse—

HE GOT HIS CHEMICAL.

"HERBICIDOL"
NOW
Insured
For Your Protection

NO SINGLE ITEM IN TRACK MAINTENANCE WORK BRINGS A GREATER RETURN THAN THE USE OF CHEMICAL WEED KILLER UNDER EXPERIENCED DISTRIBUTION. THIS YEAR OF ALL YEARS, FACING A 40-HOUR WEEK, CHEMICAL WEED KILLER PAYS OFF IN A BIG WAY.



READE MANUFACTURING COMPANY, INC.

Executive Headquarters
135 Hoboken Avenue
Jersey City 2, N. J.

Service Headquarters
9500 Cottage Grove Avenue
Chicago 28, Illinois

PLANTS IN NUMEROUS RAILROAD CENTERS

READE EST 1883

For additional information on any of the products described on this page, use postcards, page 523.

In the new cover lens the center portion is raised. Thus, when the lens is applied to a filter lens, an air space exists between them which automatically minimizes fogging. The new construction also makes unnecessary the use of fiber washers.

"BACK SAVER" SEARCHING UNIT

BRANSON Instruments, Inc., 432 Fairfield avenue, Stamford, Conn., has announced that the Audigage Flaw Detector for testing rails within joint-bar limits is now available with a searching unit which permits the operator to stand erect while engaged in rail-testing operations. The new searching unit, which is directly interchangeable with existing hand-held searching units, consists of a telescoping aluminum handle, adjustable in length from 30 in. to 42 in., and a double-swivel - mounted crystal that remains in perfect contact with the surface of the rail regardless of accidental tilting of the handle. The company says that, with the new searching unit, more than 1000 rail joints have been tested in an 8-hr. day.

The company also reports that, because the crystal is protected by a quartz wear plate, the Audigage is now applicable for testing longer stretches of rail, such as rail through highway crossings, tunnels, station platforms, and water troughs, and for testing frogs and switch points.

The Audigage Flaw Detector employs ultrasonic resonance to generate a tone in a set of headphones worn by the operator, while the crystal, accurately centered over the rail web by an adjustable, insulated guide rod, is moved along the top of the rail. A perfect rail causes resonance at a frequency reflected in a 1000-cps tone in the headphones; the presence of a crack or other flaw is revealed by a distinct change in the pitch of the tone. The new searching unit weighs 1½ lb., and the complete outfit, 13 lb.

ROOFING ASPHALT

THE Zone Company, Fort Worth, Tex., has announced a new asphaltic material, called Adhesive No. 9, for building up roofs, which can be applied without prior heating. This characteristic, the company claims, makes the product cheaper, easier, and safer to apply than hot asphalts or tar, and more durable.

Adhesive No. 9 can be applied either by brush or spray. It sets rapidly, becoming tacky within 5 min. after application and reaching the desired degree of dryness and adhesion in about 4 hr. It is said to retain in the finished application the volatile oils which are lost through evaporation in the hot asphalt or tar process—oils which are vital to waterproofing and pliability.

The new product is recommended especially by the company for use in cementing flashings, seams, and junctions formed by the roof deck and vertical surfaces, and where there is an overlapping of roofing materials. One and a half gallons will cover 100 sq. ft.

TRACTOR-SHOVEL

THE Frank G. Hough Company, Libertyville, Ill., has developed a new Payloader, called the Model T12, which combines a track-type tractor and a shovel into one complete integrated unit. The company says that the new design has many advantages over the more conventional arrangement consisting of a crawler tractor equipped with a front-end shovel attachment. The chief ones, it claims, are that the engine of the new machine is mounted at the rear to provide the best balance and maximum stability; that the operator is stationed high and forward where visiblity is best; and that a special full-reversing transmission is provided which gives four speeds forward and four corresponding but faster reverse speeds. The forward-reverse or directional shift is entirely separate from the regular shift and is reported to act quickly and easily.

The Model T12 has a bucket capacity of 1 cu. yd. The boom arms and bucket dump are controlled by a pair of double-acting hydraulic rams which are reported to give precise control and to require minimum maintenance. The machine is available with either a gasoline or a diesel engine of 67 hp.

one-coat protection

for bridges with Dearborn NO-OX-ID

Exposed and inaccessible surfaces of bridges and viaducts require adequate protection against corrosion caused by moisture, brine, locomotive gases, live coals and cinders.

Dearborn NO-OX-ID "A Special" is the thoroughly tested, simple and economical method that does this job with but a *single* coat . . . and without expensive preparation of the surfaces involving power tools, sandblast equipment. Just wire-brush the surface to remove loose paint film and rust scale. Then brush on the NO-OX-ID "A Special" and corrosion is stopped.

Now is the time to prevent corrosion of vital metal structures. A Dearborn engineer will assist you in developing a thorough and effective preventive maintenance program.

Please Note Our New Address

DEARBORN CHEMICAL COMPANY

Merchandise Mart Plaza • Chicago 54, Illinois

WRITE FOR BOOKLET ON NO-OX-ID

A copy of "NO-OX-ID for Maintenance of Steel Structures in the Railroad Industry" will be sent on request. Mail the coupon.

Dearborn Chemical Company
Merchandise Mart Plaza, Dept. RE
Chicago 54, Illinois

☐ Please send a copy of "NO-OX-ID for Maintenance of Steel Structures in the Railroad Industry."

☐ Have a Dearborn Engineer call.

Name.....

Railroad.....

Address.....

City.....*Zone*.....*State*.....

Dearborn
Reg. U. S. Pat. Off.

NO-OX-ID
IRON + OX = RUST

THE ORIGINAL RUST PREVENTIVE

THE MONTH'S NEWS

Railway Personnel

General

A. Hayden Exon, supervisor of bridges and buildings on the Southern at Somerset, Ky., has been appointed trainmaster at Danville, Ky.

W. Thomas Rice, superintendent of the Richmond, Fredericksburg & Potomac, and an engineer by training and experience, has been promoted to general superintendent, with headquarters as before at Richmond, Va.

Engineering

R. C. Postels, division engineer on the Minneapolis, St. Paul & Sault Ste. Marie at Thief River Falls, Minn., has been transferred to Superior, Wis. **Earl P. Hackert** succeeds Mr. Postels.

R. C. Baker, supervisor of bridges and buildings on the Chicago & Eastern Illinois, has been advanced to engineer of structures, with headquarters remaining at Danville, Ill. He succeeds **J. E. Bernhardt,** whose retirement was noted in the March issue.

Ross O. Stewart, engineer of bridges of the Canadian National System, has been appointed assistant chief engineer, construction, with headquarters as before at Montreal Que. He is succeeded by **T. H. Jenkins,** engineer of bridges of the Central region at Toronto, Ont. Mr. Stewart was born at Lindsay, Ont., on May 19, 1889, and was graduated from the University of Toronto in Applied Science in 1911. He began his

Ross O. Stewart

career in the engineering department of the Dominion Bridge Company, and in 1913 he joined the Canadian Government Railways as assistant bridge engineer at Moncton, N. B. After the organization of the Canadian National, Mr. Stewart was appointed assistant engineer of standards, first at Toronto and then at Montreal. He was named engineer of bridge standards in 1931, and in 1932

For additional information, use postcard, pages 523-524

became assistant structural engineer. Later in 1932, he was appointed assistant engineer of bridges, and was advanced to engineer of bridges in 1942.

Mr. Jenkins was born at Toronto on May 1, 1902, and was graduated from the University of Toronto in 1925 with a Bachelor of Science degree in civil engineering. He entered the service of

T. H. Jenkins

the Grand Trunk Western on November 1, 1926, as a draftsman in the office of the chief engineer at Detroit, Mich. From 1928 to 1933 he served as designer and squad leader on the Royal Oak to Pontiac relocations, and from 1933 to 1940 as designer and estimator on project assignments. In 1940 he was advanced to chief draftsman in the office of the chief engineer, and was appointed bridge engineer in 1927. He was transferred to Toronto in 1949.

R. H. Abbott, assistant division engineer on the Chesapeake & Ohio, has been promoted to division engineer, with headquarters as before at Richmond, Va., succeeding **F. G. Cobb,** whose appointment as trainmaster was announced in the May issue. Mr. Abbott, in turn is succeeded by **R. K. Short,** resident engineer at Peru, Ind.

E. S. English, division engineer on the Canadian National at Regina, Sask., has been appointed acting district engineer of the Manitoba district, with headquarters at Winnipeg, Man., succeeding **J. Conrad,** who has been assigned to special duties. **C. D. Worby,** assistant division engineer at Prince Rupert, B. C., has been appointed acting division engineer at Regina to succeed Mr. English.

J. E. Chubb, assistant division engineer on the Pennsylvania at Columbus, Ohio, has been promoted to division engineer at Williamsport, Pa., succeeding **J. E. Vandling,** whose appointment as superintendent of safety is announced elsewhere in these pages. **H. P. Morgan,** assistant division engineer in the office of the chief engineer system at Philadelphia, Pa., has been transferred to Columbus to replace Mr. Chubb.

Effective May 16, **H. G. Dennis,** who has been serving as acting superintendent on the Chicago, Rock Island & Pacific

(Continued on page 564)

Railway Personnel (Cont'd)

at Des Moines, Iowa, returned to his position as district maintenance engineer, with headquarters at Kansas City, Mo. At the same time **R. L. Etherton,** who has been serving as acting district maintenance engineer at Kansas City during the absence of Mr. Dennis, was appointed district maintenance engineer, with headquarters at Rock Island, Ill., a new position.

Troy A. Barnett, who has been appointed assistant division engineer on the Southern, with headquarters at Atlanta, Ga., as announced in the April issue, was born at McDonough, Ga., on July 22, 1906. He entered the service of the Southern as a section laborer at Greenwood, Ga., on August 1, 1922. Appointed relief foreman on the Atlanta division on November 9, 1925, Mr. Barnett served in that capacity and as extra gang foreman and section foreman at various locations until June 1944, when he was advanced to track supervisor at Cochran, Ga. In June, 1948, he was transferred to Hickory, N. C., where he served until his recent promotion.

Robert H. Campbell, whose promotion to assistant division engineer on the Southern at Birmingham, Ala., was announced in the May issue, was born at Greensboro, N. C. on October 24, 1918. He entered the service of the Southern in July, 1934, as a section laborer, serving subsequently as rodman, air-compressor operator and student apprentice. Becoming assistant track supervisor at Spartanburg, S. C., in November, 1941, he was advanced to track supervisor at Oxford, N. C., in January 1942, and later served in the same capacity at South Clarksville, Va., Keysville, Va., Spartanburg, and Bremen, Ga. He was serving at Bremen at the time of his recent appointment.

J. M. MacBride, assistant engineer of track on the Canadian Pacific at Montreal, Que., has been promoted to special engineer, with headquarters at Winnipeg, Man., succeeding **K. A. Truman,** who has been appointed special engineer at Calgary, Alta., to act as project manager for the Calgary-Revelstoke

J. M. MacBride

For additional information, use postcard, pages 523-524

dieselization program approved for the present year. Mr. McBride, a native of Woodstock, N. B., entered the service of the Canadian Pacific in 1939 on graduation from the University of New Brunswick, and has been in the chief engineer's office at Montreal since that time. He was appointed assistant engineer of track in 1944. A sketch of Mr. Truman's railway career was published in the April, 1951, issue.

Murray O. Cochrane, whose appointment as engineer maintenance of way, subsidiary lines, on the Southern, with headquarters at Charlotte, N. C., was

Murray O. Cochrane

announced in the May issue, was born at Charlotte on October 4, 1897, and received his higher education at the University of North Carolina. He was first employed by the Southern as a rodman in November, 1917, and later served as levelman and assistant engineer. In 1928 he was appointed resident engineer on construction for the Tennessee Highway Department at Knoxville. Following a period, from 1932 to 1937, during which he was engaged in other than engineering work, Mr. Cochrane returned to the Southern in July of the latter year as assistant engineer maintenance, subsidiary lines, and became assistant superintendent of the Danville & Western at Danville, Va., in July, 1943. He was appointed assistant engineer maintenance of way, subsidiary lines, at Charlotte in March, 1944, which position he held at the time of his recent promotion.

R. E. Peck, assistant bridge engineer of the Missouri Pacific, has been promoted to bridge engineer, with headquarters as before at St. Louis, Mo. He succeeds **J. R. Showalter,** who has retired. **E. I. Beesley,** assistant engineer at St. Louis, succeeds Mr. Peck.

Mr. Showalter was born on December 16, 1884, at Kokomo, Ind., and graduated from De Pauw University in 1906. Following employment with the Illinois Steel Company, Chicago, and service as deputy county surveyor of Kokomo, Ind., he began his railroad career in 1911 as district bridge inspector for the Baltimore & Ohio. Two years later he joined the M. P. as system bridge inspector.

(Continued on page 566)

Railway Personnel (Cont'd)

From 1918 to 1929 he served as superintendent and vice-president of the I. E. Smith Construction Company, Richmond, Ind., subsequently returning to the M. P. as assistant engineer. Mr. Showalter was appointed bridge engineer in 1943.

George A. McRoberts, who has been appointed division engineer on the Southern at Birmingham, Ala., as announced in the April issue, was born at LaGrange, Ky., on February 12, 1896. He entered the service of the Southern as an assistant engineer at Macon, Ga., in March, 1928, serving as rodman and junior engineer at Chattanooga, Tenn., and Cincinnati, Ohio. In June, 1935, Mr. McRoberts became assistant to roadmaster at Somerset, Ky., and in January, 1936, was appointed track supervisor at Cincinnati. He was made bridge and building supervisor at Lexington, Ky., in January, 1939, assistant roadmaster at Hattiesburg, Miss., in May, 1940, and was transferred to Louisville, Ky., in the latter capacity in March, 1941. He returned to Lexington as bridge and building supervisor in December, 1942. He was appointed assistant division engineer at Louisville in September, 1949, and was transferred to Birmingham in November, 1950, where he remained until his recent promotion.

William Patterson, who has been promoted to assistant division engineer on the Canada division of the New York Central at St. Thomas, Ont., as reported in the March issue, was born at London, England, on January 3, 1894. He began service with the N.Y.C. as a section laborer at Iona, Ont., on August 1, 1915. During the period between 1919 and 1925, he was loaned to railroad contractors as an extra gang foreman. Subsequently, he worked as extra gang foreman and laborer until 1936, when he was promoted to roadmaster, with headquarters at St. Thomas. In 1938, Mr. Patterson was appointed assistant supervisor of track, and was advanced to supervisor in 1939, retaining the latter position until his recent promotion.

Track

Charlie B. Foster, whose appointment as track supervisor on the Southern at Charleston, S. C., was announced in the May issue, was born at Duncan, S. C., on November 13, 1920. He entered the employ of the Southern as a laborer at Spartanburg, S. C., on August 10, 1942. Following military service from February 13, 1943, to December 6, 1945, he returned to the Southern at Salisbury, N. C., where he served as laborer and relief foreman until May 15, 1947, when he was appointed rodman at Charlotte, N. C. From November, 1948, to September 1, 1949, Mr. Foster held various positions at Salisbury. On the latter date, he was promoted to roadmaster on the Danville & Western at Danville, Va., and continued in that capacity until his recent appointment.

Roy Hixson, assistant track supervisor on the Southern at Cincinnati, Ohio, had been advanced to track supervisor at New Orleans, La., and **Charles C. Sweatt,** extra gang foreman on the Birmingham division, has been advanced to track supervisor, with headquarters at Bremen, Ga.

Troy Hardin, section foreman on the Pocahontas division of the Southern, has been appointed acting assistant roadmaster at Williamson, W. Va., to succeed **W. S. Clement,** whose appointment as acting roadmaster at Pulaski, Va., was noted in the April issue.

K. E. Henderson has been appointed roadmaster of the 82nd track division of the St. Louis-San Francisco, with headquarters at Chaffee, Mo., and **J. H. Brown** has been appointed acting roadmaster of the 83rd track division, with headquarters also at Chaffee.

D. D. Rake, assistant supervisor of track on the Eastern division of the Pennsylvania, has been promoted to supervisor of track at Columbus, Ind., succeeding **J. P. McIntyre,** who has been transferred to Reading, Pa. Mr. McIntyre succeeds **T. C. Netherton,** who has been transferred to Fort Wayne, Ind. **J. J. Stiles,** supervisor of track on the Cleveland division, has been transferred to Urbana, Ohio, succeeding **W. W. Worthington,** who has resigned. **H. E. Simmons,** junior engineer on the Fort Wayne division, has been promoted to assistant supervisor of track at Enola, Pa.

Donald H. MacLeod, who has been appointed track supervisor on the Southern at Cochran, Ga., as announced in the April issue, was born at Crozet, Va., on May 7, 1923, and graduated from the University of Tennessee with the degree of Bachelor of Science in civil engineering in December, 1949. He began service with the Southern on February 1, 1950, as a student apprentice on the Central lines. On October 1, 1950, he was advanced to assistant track supervisor at Hickory, N. C., transferring to John Sevier (Knoxville), Tenn., on December 1, 1950, where he served until his recent promotion.

Herbert D. Minnis, Jr., whose promotion to track supervisor on the Southern, with headquarters at Orangeburg, S. C., was announced in the April issue, was born at Charlotte, N. C., on August 18, 1921, and graduated in civil engineering from Clemson College in June, 1943. Immediately following graduation, he entered the employ of the Southern as a rodman at Charlotte. In August of that year, he joined the Corps of Engineers, U. S. Army, in which he served until March, 1947, when he returned to his former position as rodman. From June, 1947, to November, 1948, Mr. Minnis worked as student apprentice at Mooresville, N. C., Winston-Salem, and Charlotte, following which, he was appointed assistant track supervisor at Charlotte. He was occupying the latter position at the time of his recent promotion to track supervisor.

(Continued on page 568)

Railway Personnel (Cont'd)

Special

J. E. Vandling, division engineer on the Pennsylvania, at Williamsport, Pa., has been appointed superintendent of safety for the Eastern region, and **H. W. Anderson,** assistant engineer on the Middle division, has been appointed supervisor of safety on the Maryland division.

Obituary

Walter L. Fales, retired supervisor of track on the New York Central, died recently at Kingston, N. Y., at the age of 77.

Thomas E. Boyle, superintendent of the Maryland division of the Pennsylvania, and formerly division engineer of the Conemaugh division and, later, the Philadelphia Terminal division, died on April 26 at Philadelphia, Pa.

C. H. N. Connell, retired district engineer on the Canadian National, died recently at Vancouver, B. C., at the age of 74, and **G. Jenkins,** retired roadmaster, died recently at Fort Rouge, Man.

John Reimann, engineer, construction and surveys, on the Richmond, Fredericksburg & Potomac, died on May 10 after an illness of several weeks. Mr. Riemann joined the R. F. & P. in 1924. Prior to then he served with the Bureau of Valuation of the I.C.C.

Association News

Bridge and Building Association

On the call of President Huckstep a meeting of the Executive committee will be held at the Chicago Engineers' Club on July 23. The chairmen of the eight subjects committees will be invited to attend the meeting to present the reports they have prepared for presentation at the annual convention to be held September 17-19. Preliminary plans for the convention program will also be discussed, including that phase that will deal with observance of the association's sixtieth anniversary.

American Railway Engineering Association

Three standing committees have scheduled meetings to be held in June. The Committee on Masonry will meet at the General Brock Hotel, Niagara Falls, Ont., on June 28-29. On June 21-22 the Committee on Highways will meet at New Orleans, La. During this meeting the committee members will inspect the New

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 11-13, 1952, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren Street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting September 26-28, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual Meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

For additional information, use postcard, pages 523-524

Orleans consolidated terminal layout now under construction, which involves a large number of grade-separation projects. The Committee on Yards and Terminals will meet at the Andrew Johnson hotel, Knoxville, Tenn., on June 17-18-19. The first day of this meeting has been set aside for an inspection of a new retarder installation at the John Sevier yard of the Southern.

Metropolitan Maintenance of Way Club

E. L. Wilson, supervisor of track on the New York Central at Weehawken, N. J., was elected president of the club at the annual meeting held at the Hotel Shelburne, New York, on April 26. Mr. Wilson succeeds E. F. Shelley, track supervisor, Central Railroad of New Jersey, Jersey City, N. J. Arthur Price, division engineer, Erie, Jersey City, succeeds Mr. Wilson as first vice-president, and Ralph I. Frame, of the Board of Transportation, New York Subway System, was elected second vice-president. John S. Vreeland, of the eastern sales staff of the Simmons-Boardman Publishing Corporation, will continue as acting secretary-treasurer.

The next meeting of the club will be the annual outing which will be held at the Out O'Bounds Aero & Golf Club at Suffern, N. Y., on June 21.

Roadmasters' Association

President Halverson has scheduled a meeting of the Executive committee to be held at the Chicago Engineers' Club on July 9. The principal item of business will be the reading and review of preliminary drafts of the committee reports that have been prepared for presentation at the convention to be held September 17-19. Preliminary plans for the convention program will also be discussed.

Supply Trade News

General

The Buda Company, Harvey, Ill., has appointed the **Service Supply Company,** Philadelphia, Pa., as its sales representative for railroads with headquarters in Philadelphia and Eastern Pennsylvania.

Fairbanks, Morse & Co., Chicago, recently dedicated a new sales and service office building at 3000 West 117th street, Cleveland, Ohio. The new office is the sixth one completed thus far under the company's present expansion plan.

Walter McGuire Company, Inc., New York, has announced the appointment of **C. Raymond Ahrens, Inc.,** 30 Church street, New York, as the national distributor to railroads of its product—Cortland Emery Aggregate.

The **John N. Thorp** Company, Inc., distributor of railway and marine supplies, has moved its office from 50 Church street, New York, to 78 Middagh street, Brooklyn 2, N. Y.

Personal

J. O. Chesley, manager of the Railroad division of the **Aluminum Company of America,** Pittsburgh, has retired. No immediate successor to his position will be named.

The board of directors of the **Black & Decker Manufacturing Co.,** Towson, Md., has announced that **Alonzo G. Decker,** a co-founder of the company, has been elected president to succeed the late **S. Duncan Black.**

The **Dearborn Chemical Company,** Chicago, has announced the addition of **L. C. Henley** to the service staff of its Railroad department. He succeeds **J. W. Day,** who has been called to active military service. Mr. Henley was formerly a car foreman on the Illinois Central.

Joseph V. Condon has been named general manager of **Canadian Railroad Service Company, Ltd.,** a unit of the **Union Carbide & Carbon Corp.,** with headquarters at Toronto, Ont. He succeeds H. V. Gigandet, vice-president of

(Continued on page 570)

Joseph V. Condon

the company, who has retired. Mr. Condon was born at Hamilton, Ont., in 1909, and before becoming associated with Canadian Railway Service in 1941, worked for the Canadian National.

Richard E. Stiegele, who has been handling special assignments for the general sales department of the **Hyster Company,** at Portland, Ore., has been promoted to sales manager, Eastern Tractor Equipment Sales division, with headquarters at Peoria, Ill. Mr. Stiegele began his business career with the Caterpillar Tractor Company at Peoria, and for 10 years was in the parts, service and sales departments. During World War II. he served four years with aviation engineers of the United States Army Corps of Engineers on airfield

Richard E. Stiegele

construction and, after a brief return to Caterpillar in 1946, he joined Hyster. For two years, Mr. Stiegele was a district representative in Southeastern states and in 1948 was transferred to Portland.

The board of directors of the **Allis-Chalmers Manufacturing Company,** Milwaukee, Wis., has announced the election to vice-president of **Boyd S. Oberlink,** who has been serving as assistant to vice-president in charge of the Tractor division. Mr. Oberlink attended James Millikin University, and was graduated

Boyd S. Oberlink

from the University of Illinois in 1932, with the degree of Bachelor of Science in mechanical engineering. He joined Allis-Chalmers in 1934 as an industrial service man and demonstrator in the Tractor division, and was named assistant supervisor of the Allied Equipment department of that division in 1936. In

1940 he was appointed manager of the Tractor division's Washington (D. C.) office. Mr. Oberlink returned to Milwaukee in 1943 as assistant industrial sales manager and was named assistant to vice-president in charge of the Tractor division in 1946.

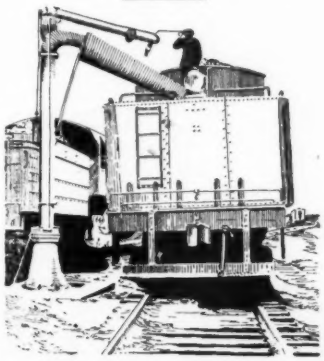
Eugene C. Bauer has been elected president of **Poor & Co.** and chairman of the board of both the **Kensington Steel Company,** Chicago, and the **Pioneer Engineering Works** (Poor & Co. subsidiary), Minneapolis, Minn. As president of Poor & Co., Mr. Bauer succeeds **Philip W. Moore,** who has retired. Mr. Bauer was formerly first vice-president of Poor &

Eugene C. Bauer

Co. and president of Kensington Steel Company. **Max K. Ruppert,** president of the **P. & M. Company,** the **Maintenance of Equipment Company,** and vice-president of Poor & Co., succeeds Mr Bauer as first vice-president. Mr Ruppert was also made a member of the company's executive committee.

Educated in the Chicago public schools, Mr. Bauer subsequently attended business college and completed courses with the International Correspondence Schools. He began his business career in 1906 in a Chicago law office and two years later entered the railway supply field when he became employed by a manufacturer of railway equipment and brake shoes, transferring to a subsidiary manufacturing austenitic manganese steel in 1911. After holding various positions in 1923 he became

(Continued on page 572)



Supply Trade News (Cont'd)

one of the organizers of the Inland Engineering Company, which firm's name was changed to the Kensington Steel Company in 1926. In 1945 control of the Kensington Steel Company was vested with Poor & Co., which transaction resulted in Mr. Bauer's becoming a director and vice-president of Poor & Co. In April, 1950, he was elected first vice-president, continuing also as president of Kensington Steel Company.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 523.)

Portable Air Compressor—The Worthington Pump & Machinery Corp. has published an illustrated bulletin describing, with specifications, the Blue Brute 160-c.f.m. portable air compressor. The bulletin is designated as No. H-850-B73.

Earth Moving—The Caterpillar Tractor Company is offering a 16-page illustrated bulletin entitled "Cat Scrapers Built for Your Job", which presents the design features and performance characteristics of Caterpillar tractor-scrapers.

Crawler Cranes in ¾-Yd. Class—Bay City Shovels, Inc., is offering a 20-page catalog on its ¾-yd. series of crawler-mounted shovel-cranes. Featured in the catalog is the heavy-duty design and construction of the machines. Machinery assemblies, parts and attachments are shown in pictures and described in detail.

Yard Cleaning Machine—The Nordberg Manufacturing Company has published a four-page two-color bulletin describing the design features and operation of the Nordberg DSL Yard Cleaner—a self propelled on-track machine that incorporates a high-speed impeller and a waste conveyor for removing debris from tracks and loading it into cars.

Protective Equipment for Welders—Willson Products, Inc., is offering a four-page circular describing and illustrating a wide range of eye-protective devices for both gas and arc welding. Included also is information on respiratory protection for welders, accessories, such as rubber-mask padding for goggles, the Weld-Aid lens for welders who wear bifocal glasses, and various types of filter glass.

Precast Concrete Products—The Permacrete Products Corporation is offering a 52-page illustrated catalog describing, with specifications, the Permacrete line of reinforced precast concrete products for railroad use, including crossing slabs, Tri-Crib units for constructing retaining walls, fence and right-of-way posts, Corflor units for roof and floor constructon, battery boxes, signal foundations, monolithic foundations, sectional concrete buildings, and others. The cat-

alog also gives the basic principles of Permacrete design and manufacture, and installation instructions.

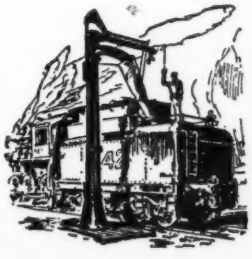
Handbook on Caterpillar Equipment—A four-color operator's handbook printed in comic-book style and designed to make the operation of Caterpillar earthmoving equipment easy to understand, has been published by the Caterpillar Tractor Company. It contains information on the operation of bulldozers, scrapers, rippers, and cable controls, and material on high-speed hauling and the use of grade stakes. It also explains when to use bulldozers, how to pioneer side-hill cuts, push loading, rock and tree removal, soft-fill work, do's and dont's of proper tractor-dozer adjustment and operation, and other earthmoving applications. The cartoon illustrations clearly show operators how to obtain the best performance.

Installing Underground Structures—Armco Drainage & Metal Products, Inc., has issued a new folder entitled "Why Hire a Wrecking Crew to Install Underground Structures", which tells how to install sewers and other underground structures by tunneling with Armco liner plates. The folder points out how the plates can be installed easily with a minimum of excavation and how their design insures ample strength for a wide variety of uses.

Wood Preservation—A fact guide on "penta" pressure-treated wood, entitled "Pointers on Penta", has been published by the Dow Chemical Company. The booklet gives technical information regarding the adaptation of "penta" treatments to meet various requirements.

Drainage Structures — An illustrated folder entitled "An Economical Answer to Limited Headroom—Fast Runoff" describing the applications and characteristics of Armco pipe-arch and multi-plate pipe arch, has been published by Armco Drainage & Metal Products, Inc. The folder also discusses erosion and corrosion problems and tells how paved-insert and asbestos-bonded pipe arch can be used to solve them.

Cumulative Weed-Control Program—The General Chemical division of the Allied Chemical & Dye Corp., is offering a folder discussing a program of weed control offered by General Chemical, which aims at the eradication of persistent perennial root systems, with diminishing annual expenditures. The folder includes color photographs showing the cumulative results obtained from multiple treatments on various railroads.



Two New Tractors—Two 16-page catalogs, each telling the story of a new Allis-Chalmers crawler tractor, have been issued by the Tractor division of the Allis-Chalmers Manufacturing Company. One describes the 70-hp. Model HD-9, and the other, the 102-hp. Model HD-15. Complete specifications, and details of allied equipment and special accessories are also included.

Air Foam Equipment—A new 24-page brochure on air foam or mechanical foam for fire fighting has been released by the Pyrene Manufacturing Company. It includes data on methods of application; high and low expansion types of foam compound; specifications and operating characteristics for five sizes of portable playpipes; mobile and stationary foam proportioning tanks; installations of auto-induction and pressure-line inductor systems; and air-foam systems for motor fire apparatus.

Onan Electric Plants—D. W. Onan & Sons, Inc., has published an eight-page, two-color, illustrated booklet cataloging he complete line of Onan gasoline-driven electric plants, ranging from 260 watts to 35,000 watts, in all standard voltages, frequencies and phases. The booklet also itemizes the special accessories for the electric plants and includes a model guide and general information section which gives instructions for choosing the proper type, size and starting method.

Advertisers IN THIS ISSUE

Well laid road beds and their continual maintenance insure greater comfort and safety to passengers, and greater economy to management.

One important factor in fine track is the original installation of *powerful spring washers* and the occasional retightening of these reactive helical springs—the proved values of which are

- ★ **equalizing bolt tensions**
- ★ **insuring resilient joints**
- ★ **absorbing shocks and stresses**
- ★ **protecting rail ends**

Improved Hipowers reduce maintenance costs.

IMPROVED HIPOWERS

IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

HERE is the reason

.... JOINTS DON'T "FREEZE"

. . . when protected by Texaco Rail Joint Lubrication

The rail joint in the illustration above was taken down for inspection after several years in service, protected by Texaco Rail Joint Lubrication. Note that fishing surfaces are still well lubricated . . . rail ends free from corrosion in spite of brine drippings from reefers. There is no noticeable wear.

Texaco Rail Joint Lubrication is your best assurance of freedom from frozen joints, kinks and pull-in-twos. It's quick, easy and economical to apply, and the protection lasts an average of five years. Simply seal joint ends with *Texaco Plastic Material "H,"* then pump *Texaco 904 Grease* into the joint through applicator pipe. No taking joint down, no interference with traffic.

Railroads everywhere report maintenance cost savings that more than repay the low initial cost of Texaco Rail Joint Lubrication. A Texaco representative will gladly give you full details. Just call the nearest Railway Sales office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

NEW YORK • CHICAGO
SAN FRANCISCO • ST. PAUL • ST. LOUIS • ATLANTA

LET TEXACO HELP REDUCE THESE MAINTENANCE COSTS, TOO

★★ To eliminate "soft track" and assure longer lasting stability, use asphalt-cement pressure grouting—with *Texaco No. 24 Emulsified Asphalt.*

★★ To assure better drainage, cleaner track, coat stone ballast with *Texaco Asphalt.*

TEXACO

TEXACO Rail Joint Lubrication

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station